United States
Department of
Agriculture

Forest
Service

North Central
Forest Experiment
Station

Research
Paper **NC-209**

A Simulated Inventory Update:

Wisconsin's 1979 Timber Resource

Gerhard K. Raile and W. Brad Smith

FOREWORD

This report presents Wisconsin's timber resource in 1979 as updated by the Forest Resources Evaluation Program (FREP). Current forest areas, timber volumes, growth, mortality, and removals are estimated and compared with the 1956 and 1968 surveys.

There are limits to the FREP's abilities. Although the system predicts mortality it has no mechanism for handling recent catastrophic changes in Wisconsin's forests. But the FREP model is still being developed and improved. This first attempt at updating a State inventory using FREP is not intended to take the place of a re-survey of Wisconsin; a new State inventory is scheduled to begin in 1981.

The following persons assisted in the Wisconsin update:

North Central Forest Experiment Station personnel:

Pamela Jakes, Associate Resource Analyst
Joan Stelman, Statistical Assistant
Patrick Peine, Statistical Assistant
Susan Krueger, Statistical Clerk

Wisconsin Department of Natural Resources personnel.

North Central Forest Experiment Station
Forest Service U.S. Department of Agriculture
1992 Folwell Avenue
St. Paul, Minnesota 55108
Manuscript approved for publication July 18, 1980

1982

A SIMULATED INVENTORY UPDATE: WISCONSIN'S 1979 TIMBER RESOURCES

Gerhard K. Raile
and
W. Brad Smith
Associate Mensurationists

BACKGROUND

Current facts about the Nation's forest resources such as area, timber volume, biomass, ownership, and prospective supply and demand are essential in the formation of management policies and practices. The Forest and Rangeland Renewable Resources Planning Act of 1974 specifically requires the Forest Service to make and keep current a comprehensive inventory and analysis of renewable forest and rangeland resources.

In the past, resource evaluation techniques have provided forest resource information that was often months, and, unfortunately, sometimes years, old before it was widely available for use. To meet the need for more current forest resource information, the North Central Forest Experiment Station (NCFES) began the Forest Resources Evaluation Program (FREP) in 1975.[1]

When fully developed, FREP will be a computerized resource evaluation system capable of evaluating economic, ecologic-environmental, and sociocultural aspects of timber, wildlife, recreation, water, forage, and special uses (Lundgren and Essex 1979). In an evaluation of FREP as an inventory tool, the 1968 Wisconsin forest survey (Spencer and Thorne 1972) was updated to the year 1979.

[1]*The FREP growth projection system was developed jointly by a team of researchers at the North Central Forest Experiment Station. Included were Rolfe A. Leary, Jerold T. Hahn, Roland G. Buchman, Gary Brand (working on a cooperative agreement through the University of Minnesota), Brad Smith, Margaret Holdaway, Jerrilyn LaVarre Thompson, and Linda Christensen.*

METHOD

A tree growth projection subsystem of FREP was used to update the 1968 Wisconsin survey to 1979. This subsystem of FREP is a distance-independent individual tree growth simulator (Munro 1974) of modular design. It consists of an executive program and a series of functional subroutines. Updated tree lists are generated through the simulation of growth and mortality. Management routines are available to prescribe and carry out silvicultural activities. A brief overview of FREP is available in "FREP 78: The Updated Tree Growth Projection System" (Hahn *et al.* 1979).

The Wisconsin update was conducted without the use of new field or photo-interpretive work. New inventory data from the Chequamegon (1976) and the Nicolet (1975) National Forests were used as a starting point for updating the National Forest data because the 1968 Wisconsin survey included National Forest data adjusted from 1967 and 1964 inventories to 1968. The term "update," as it is used here, is an estimate of current forest statistics derived by modeling the dynamic change in a forest from a known time in the past. The four major components that define this change are growth, mortality, regeneration, and removals.

Growth and Mortality

Growth and mortality functions[2] were calibrated and validated with data from throughout the Lake

[2]*The derivations of the FREP growth functions (Hahn and Leary 1979, Leary and Holdaway 1979, Holdaway* et al. *1979) and mortality functions (Buchman 1979) are too long to present here.*

States (Christensen *et al.* 1979). Test projections made in Wisconsin over a wide range of forest conditions produced reliable results when compared with the previous Wisconsin data (Leary *et al.* 1979).

Regeneration

Although FREP regeneration routines[3] for the Lake States had not been developed by the time of the update, this did not significantly affect the projection. Most trees that became established on harvested land during the 11-year update period would not have grown to merchantable size. Tables showing number of trees in this report include trees below the 6-inch diameter class. Because there was no regeneration, these are trees that were in the original 1.0-to 4.9-inch sample and did not grow into the 6-inch diameter class.

Removals

Timber removals for the update fall into two categories, product and nonproduct. Timber removals for products was estimated using data collected by North Central's Renewable Resources Evaluation Project. Project staff collect pulpwood data annually, saw log data every 2 to 5 years, veneer log data every 2 years, and data on total removals (including poles, pilings, fuelwood, and an estimate of nonproduct removals) at the time of each State forest survey. For the update, pulpwood, saw log, and veneer data were compiled for each available year during the update period. Data for missing years were estimated by analyzing trends in wood consumption for the State (U.S. Department of Commerce, 1967-1978).

It was not possible to make an annual estimate of nonproduct removals — the timber removals from cultural operations and changes in land use. But estimates of removals caused only by changes in land use may be made by estimating the volume by forest type occurring on the commercial forest area lost since 1968. The area of commercial forest land in 1979 was assumed to be the same as a 1977 estimate made by the North Central Forest Experiment Station and the Wisconsin Department of Natural Resources (USDA Forest Service 1978). Area expansion factors used in the 1968 survey were adjusted for each forest type, so that the final updated acreage would coincide by type with the 1977 estimate of commercial forest area. Because stand-size class was determined by the projection, acres by size class will not agree with the 1977 estimate.

The current version of FREP has no provision for simulating actual removals. The system was modified to set removals during the update to the levels estimated above. Computerized Lake States guides (Brand 1979) were used in the projection system to select a subset of plots that were eligible for silvicultural treatment during the update period. Lake States guides were used in lieu of detailed information on Wisconsin timber management strategies. The FREP projection system was then modified by adding a special removals analysis algorithm. Each of the eligible plots was scanned by the algorithm to determine whether it would be cut. The volume from cut plots was accumulated until the estimated volume of growing-stock removals by species was reached.

Information on update costs and data requirements are outlined in "FREP: Application of the Tree Growth Projection System for Inventory" (Smith and Raile 1979).

UPDATE RESULTS

Area Trends

The total commercial forest area in Wisconsin has declined 3 percent since 1956 and will probably continue to decline in the near future. It is estimated that commercial forest land now accounts for 42 percent of all land in the State.

The aspen-birch[4] and maple-beech-birch forest types make up 29 and 25 percent of the commercial forest area, respectively. These types have dominated the forest area of Wisconsin as far back as the first official survey in 1936, although the percentage of northern hardwoods has been increasing while aspen-birch has been declining. The natural succession of aspen-birch stands to maple-beech-birch stands accounts for much of this shift. With the exception of aspen-birch, all hardwood types show modest increases in acreage during the update period (table 1).

---

[3]*Buchman, R. G. Lake States tree recruitment for the north central generalized forest tree growth projection system. Unpublished Station study FS-NC-4252(78-04), on file at North Central Forest Experiment Station, St. Paul, Minnesota.*

[4]*In the 1956 survey the aspen and birch forest types were combined, so the 1968 and 1979 aspen and birch types were added together for comparison.*

Table 1. — *Area of commercial forest land by forest type, Wisconsin, 1956, 1968, and updated 1979*

Forest type	1956		1968		1979	
	Thousand acres	*Percent of total*	*Thousand acres*	*Percent of total*	*Thousand acres*	*Percent of total*
Jack pine	687	5	727	5	717	5
Red pine	146	1	310	2	332	2
White pine	172	1	178	2	159	1
Black spruce	207	1	236	2	215	1
Spruce-fir	352	2	628	4	601	4
Northern white-cedar	207	1	302	2	308	2
Tamarack	131	1	222	2	223	2
Oak-hickory	2,461	17	2,665	18	2,681	19
Lowland hardwoods	840	6	1,158	8	1,163	8
Northern hardwoods	2,634	18	3,522	24	3,551	25
Aspen-birch	4,684	31	4,219	29	4,202	29
Nonstocked	2347	16	370	3	326	2
All types	14,868	100	14,537	100	14,478	100

Table 2. — *Commercial forest land areas by stand-size class, Wisconsin, 1956, 1968, and updated 1979*

Stand-size class	1956		1968		1979	
	Thousand acres	*Percent of total*	*Thousand acres*	*Percent of total*	*Thousand acres*	*Percent of total*
Sawtimber	2,054	14	3,098	21	3,235	22
Poletimber	4,822	32	6,580	45	6,664	46
Seedling-Sapling	5,645	38	4,489	31	4,253	30
Nonstocked	2,347	16	370	3	326	2
All classes	14,868	100	14,537	100	14,478	100

The area of jack pine and white pine forest types has declined since 1968 — an apparent reversal of the trend noted between the 1956 and 1968 forest surveys. The red pine type, however, has shown a 127 percent increase since 1956. Much of this increase is the result of extensive plantings of red pine and the conversion of white pine sites to red pine because of blister rust. In the update, black spruce and spruce-fir types declined; northern white-cedar and tamarack types increased slightly.

Poletimber and sawtimber stands have shown a steady increase in area since the 1956 survey, but nonstocked and seedling-sapling stands have decreased. The 1979 update estimates 9.9 million acres of combined sawtimber and poletimber stands compared to 9.7 million acres in 1968 and 6.9 million acres in 1956. The area of nonstocked forest land has probably declined since the 1968 survey (table 2) although definition and procedural changes after the 1956 survey hinder interpretation of the decrease. A more detailed breakdown of the 1979 area data is given in tables 4 and 5.

Volume

Despite the decline in commercial forest area between 1968 and 1979, total growing-stock volume increased 16 percent — from 11 billion cubic feet in 1968 to 12.7 billion cubic feet in 1979 (table 3). Softwood growing-stock volume increased 36 percent and hardwood volume increased 10 percent. Softwoods continued to gain, jumping from 20 percent of all growing-stock volume in 1956 to an estimated 26 percent in 1979.

The maturing of Wisconsin's second-growth forests is shown by the upward trend in the area of sawtimber stands and the increase in sawtimber volume. Sawtimber volume has risen 44 percent since the 1968 survey and has almost doubled since the 1956 survey. Traditionally, hardwoods have been dominant, but softwoods have begun to make up an increasing percentage of the total sawtimber volume. They are now estimated to account for 33 percent of the sawtimber volume (table 3).

Table 3. — *Growing-stock and sawtimber volumes for Wisconsin, 1956, 1968, and updated 1979*

Species	Growing-stock volume						Sawtimber volume					
	1956		1968		1979		1956		1968		1979	
	Mil.cu.ft.	Percent	Mil.cu.ft.	Percent	Mil.cu.ft.	Percent	Mil.bd.ft.	Percent	Mil.bd.ft.	Percent	Mil.bd.ft.	Percent
Softwoods	1,670	20	2,475	23	3,368	26	4,783	30	6,497	30	10,318	33
Hardwoods	6,768	80	8,521	77	9,363	74	11,049	70	15,259	70	21,052	67
Total	8,438	100	10,996	100	12,731	100	15,832	100	21,756	100	31,370	100

Further evidence of the effects of Wisconsin's maturing forests is the increase in growing-stock volume per acre in all major forest types (fig. 1). A detailed breakdown of all numbers of trees and volume data is given in tables 6 through 12.

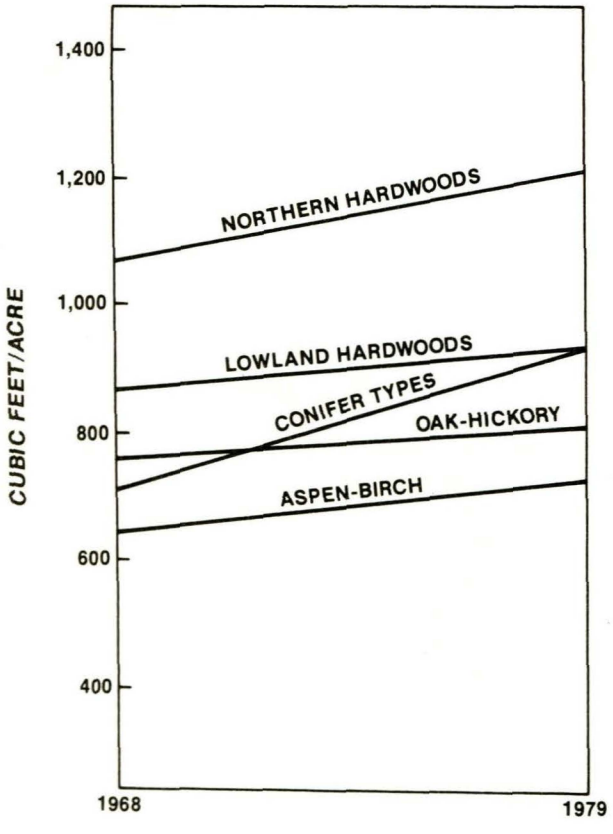

Figure 1. *Growing-stock volume trends for major types and type groups in Wisconsin, 1968 and updated 1979.*

Growth and Mortality

FREP's projected (1968-1979) average net annual growth of 346,500 cubic feet is an average annual growth rate of 3.1 percent. Net growth consists of survivor growth, ingrowth, growth on ingrowth, growth on removals, and growth on trees that die, minus mortality (tables 26-33):

Components of growth	Thousand cubic feet	Percent of total net growth
Survivor growth	312,326	90
Ingrowth	76,903	22
Growth on ingrowth	24,035	7
Growth on removals	33,525	10
Growth on mortality	24,192	7
Mortality	−124,425	−36
Total net growth	346,557	100

This projected net growth averages 24 cubic feet per acre per year for the update period compared with 34 cubic feet for 1967 and 20 cubic feet for 1955.[5]

Because there was no regeneration model in FREP at the time of this update and the original data only included d.b.h. measurements for trees 1 inch and larger, the ingrowth volumes may be slightly low over the 11-year period. The effects of no regeneration can be seen by looking at the original and current distributions of trees by diameter class in tables 7 and 8. The distributions by diameter class of mortality and removal trees are given in tables 10 and 11.

[5]*This is the unadjusted 1955 net growth rate. The adjusted 1955 rate published in the 1968 survey is 26 cubic feet per acre per year.*

The predicted average annual growing-stock mortality is 124.4 million cubic feet — 1.1 percent of the original inventory or 8.6 cubic feet per acre per year. The 1967 estimate of 4.1 cubic feet per acre per year is about half this rate, and the unadjusted 1955 mortality is 11.4 cubic feet per acre per year. The projected mortality rates by forest type are as follows:

Forest type	Cubic feet/ acre/year	Projected mortality as a percent of inventory
Jack pine	3.4	0.66
Red pine	4.3	.54
White pine	6.8	.51
Black spruce	5.1	1.36
Balsam fir-white spruce	10.8	1.43
Northern white-cedar	10.7	1.10
Tamarack	6.7	1.58
Oak-hickory	7.1	.92
Elm-ash-cottonwood	8.9	1.05
Maple-beech-birch	10.4	.97
Aspen	10.5	1.72
Birch	5.0	.69
All types	8.6	1.11

All the components of net growth are summarized for both cubic feet and board feet in tables 26-33. These tables give both periodic and average annual values by forest type and species group.

Removals

Growing-stock removals for products have increased during the past 11 years (fig. 2), except for slumps in 1972 and 1975. The 1972 decline was due to a drop in products other than pulpwood — a pattern that continued through the early 1970's. In 1975, the recession reduced all domestic production. The estimated average annual removals of growing stock for products was 193 million cubic feet from 1968 through 1978, increasing an average of 2.5 percent per year. At this rate, the predicted removal of growing stock for products for 1979 is about 214 million cubic feet.

The tables of current statistics in the appendix show growing-stock removals for products on the 1979 commercial forest land base, but inadequate data prevented tracking other removals on a yearly basis. Removals from land use change are taken into account by an adjustment in area expansion factors and therefore do not appear in the tables.

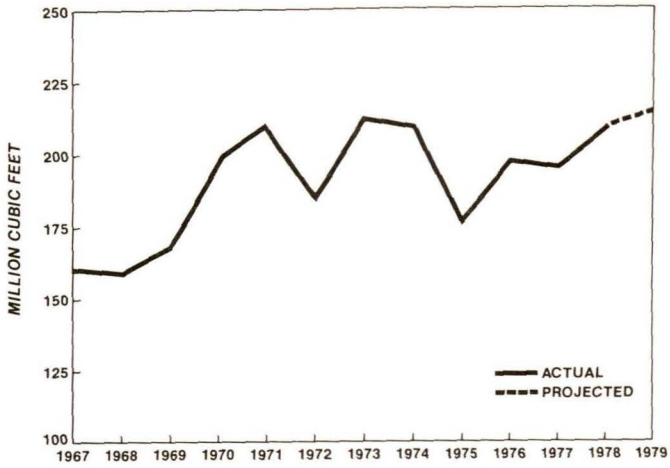

Figure 2. — *Estimated growing-stock removals for products in Wisconsin, 1967-1979.*

Biomass

Many of the equations for calculating individual tree biomass by species (Young 1976) could not be used in creating tables 34 and 35 because (1) usable equations are not available for many species in the State; (2) many equations use variables not available in the 1968 Wisconsin inventory data; and (3) some equations give unreliable estimates of biomass for large trees.

The following method was developed for estimating biomass in Wisconsin: first, the estimated net cubic foot volumes were converted to green tons by using weight conversion factors for each species (Markwardt 1930). Then, the weight of the bole bark was computed using bark correction factors for individual species and an average value of 37 pounds per cubic foot. Tops and limbs for trees 5 inches d.b.h. and over were estimated as a percent of gross bole volume. Above ground green tons for trees under 5 inches were computed from a regression equation fit to Young's tree weight table (Young *et al.* 1976). This regression equation uses d.b.h. to estimate total aboveground biomass as 80 percent of the above and belowground biomass.

LITERATURE CITED

Brand, Gary. 1979. Timber management guides and marking rules. *In* A generalized forest growth projection system applied to the Lake States region. U.S. Department of Agriculture Forest Service, General Technical Report NC-49, p. 56-60. U.S.

Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Buchman, Roland G. 1979. Mortality functions. *In* A generalized forest growth projection system applied to the Lake States region. U.S. Department of Agriculture Forest Service, General Technical Report NC-49, p. 56-60. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Christensen, Linda, Jerold T. Hahn, and Rolfe A. Leary. 1979. Data base. *In* A generalized forest growth projection system applied to the Lake States region. U.S. Department of Agriculture Forest Service, General Technical Report NC-49, p. 16-21. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Hahn, Jerold T., and Rolfe A. Leary. 1979. Potential diameter growth function. *In* A generalized forest growth projection system applied to the Lake States region. U.S. Department of Agriculture Forest Service, General Technical Report NC-49, p. 22-26. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Hahn, Jerold T., David M. Belcher, Margaret R. Holdaway, Gary J. Brand, and Stephen R. Shifley. 1979. FREP 78: Description of the updated tree growth projection system. *In* 1979 workshop on Forest Resources Inventories I:211-222.

Holdaway, Margaret R., Rolfe A. Leary, and Jerrilyn LaVarre Thompson. 1979. Estimating mean stand crown ratio from stand variables. *In* A generalized forest growth projection system applied to the Lake States region. U.S. Department of Agriculture Forest Service, General Technical Report NC-49, p. 27-30. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Leary, Rolfe A., and Margaret R. Holdaway. 1979. Modifier function. *In* A generalized forest growth projection system applied to the Lake States region. U.S. Department of Agriculture Forest Service, General Technical Report NC-49, p. 31-38. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Leary, Rolfe A., Jerold T. Hahn, and Roland G. Buchman. 1979. Tests. *In* A generalized forest growth projection system applied to the Lake States region. U.S. Department of Agriculture Forest Service, General Technical Report NC-49, p. 79-89. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Lundgren, Allen L., and Burton L. Essex. 1979. Forest resource evaluation systems — who needs them? *In* A generalized forest growth projection system applied to the Lake States region. U.S. Department of Agriculture Forest Service, General Technical Report NC-49, p. 1-4. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Markwardt, L. J. 1930. Comparative strength properties of woods grown in the United States. U.S. Department of Agriculture Technical Bulletin 158, 38 p.

Munro, D. D. 1974. Forest Growth Models — A prognosis. Royal College of Forestry, Research Note 30, 379 p. Stockholm, Sweden.

Smith, W. B., and Gerhard K. Raile. 1979. FREP: Application of the tree growth projection system for inventory update. *In* Forest Resource Inventories Workshop Proceedings 1:223-230. July 23-26, 1979. Colorado State University, Fort Collins, Colorado.

Spencer, John S., Jr., and Harry W. Thorne. 1972. Wisconsin's 1968 timber resource — a perspective. U.S. Department of Agriculture Forest Service, Resource Bulletin NC-15, 80 p. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

U.S. Department of Agriculture, Forest Service. 1978. Forest statistics of the United States, 1977 — review draft. 133 p.

U.S. Department of Commerce, Bureau of the Census. Current Industrial Reports, Lumber Production and Mill Stocks. MA-24T(67-78)-1.

Young, H. E. 1976. A summary and analysis of weight table studies. *In* Oslo Biomass Studies. p. 253-282. Life Sciences and Agricultural Experiment Station, University of Maine, Orono, Maine.

Young, H. E., L. E. Hoar, and T. C. Tryon. 1976. A forest biomass inventory of some public land in Maine. *In* Oslo Biomass Studies. p. 285-302. Life Sciences and Agricultural Experiment Station, University of Maine, Orono, Maine.

APPENDIX

DEFINITION OF TERMS

Land-Use Classes

Gross area.—The entire area of land and water as determined by the Bureau of Census, 1960.

Land area.—The area of dry land and land temporarily or partially covered by water such as marshes, swamps, flood plains, streams, sloughs, and estuaries. Canals less than 1/8-mile wide, and lakes, reservoirs, and ponds smaller than 40 acres are included as land area. These figures are from the Bureau of Census, 1960.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use. Includes afforested areas. The minimum forest area classified was 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas were classed as forest if less than 120 feet in width.

Commercial forest land.—Forest land that is producing or is capable of producing crops of industrial wood and that is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management to grow crops of industrial wood generally of a site quality capable of producing in excess of 20 cubic feet per acre of annual growth. This includes both inaccessible and inoperable areas.

Noncommercial forest land. —(a) **Unproductive** forest land incapable of yielding crops of industrial wood because of adverse site conditions, (b) **Productive-reserved**—forest land withdrawn from commercial timber use through statute or administrative regulation, or exclusively used for Christmas tree production.

Nonforest land.—and that has never supported forests, and land formerly forested where forest use is precluded by development for nonforest uses, such as cropland, improved pasture, residential areas, and city parks. Also includes improved roads and adjoining rights-of-way, powerline clearings, and certain areas of water classified by the Bureau of Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forested areas must be more than 1 acre in size, to qualify as nonforest land.

Tree Classes

All live trees.—Growing-stock, rough and rotten trees 1 inch d.b.h. and larger.

Growing-stock trees.—All live trees of commercial species except rough and rotten trees.

Desirable trees.—Growing-stock trees having no serious defects in quality limiting present or prospective use, and of relatively high vigor and containing no pathogens that may result in death or serious deterioration before rotation age. These are trees that would be favored by forest managers in silvicultural operations.

Acceptable trees.—Trees meeting the standards for growing stock but not qualifying as desirable trees.

Sawtimber trees.—Growing-stock trees of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs, each 8 feet or longer. At least 33 percent of the gross volme of the tree must be sound wood. Softwoods must be at least 9 inches d.b.h. and hardwoods at least 11 inches.

Poletimber trees.—Growing-stock trees of commercial species at least 5 inches d.b.h. but smaller than sawtimber size and of good form and vigor.

Saplings.—Live trees of commercial species 1 to 5 inches d.b.h. and of good form and vigor.

Seedlings.—Live trees of commercial species less than 1 inch d.b.h. that are expected to survive according to regional standards (examples of seedlings not expected to survive are those that are diseased or heavily damaged by logging, browsing, or fire). Only softwood seedlings 6 inches and hardwood seedlings over 1 foot in height are counted.

Rotten trees.—Live trees (any size) of commercial species that do not contain a merchantable 12-foot saw log or two noncontiguous 8-foot or longer saw logs, now or prospectively, because of rot (that is, when more than 50 percent of the cull volume of the tree is rotten).

Rough trees.—Live trees that do not contain at least one merchantable 12-foot saw log or two noncontiguous 8-foot or longer saw logs, now or prospectively, because of roughness and poor form, as well as all live noncommercial species.

Short-log (rough) trees.—Sawtimber-sized trees of commercial species that contain at least one

merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Stocking

The degree of utilization of land by trees as measured in terms of basal area and/or the number of trees in a stand compared to the basal area and/or number of trees required to utilize fully the growth potential of the land.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees do reach 5 inches d.b.h.

Stocking of all live trees, growing-stock trees, and desirable trees are recorded separately and stands are grouped into the following stocking classes.

Stocking Classes

Overstocked stands.—Stands in which stocking of trees is 133 percent or more.

Fully-stocked stands.—Stands in which stocking of trees is from 100 to 133 percent.

Medium-stocked stands.—Stands in which stocking of trees is from 60 to 100 percent.

Poorly-stocked stands.—Stands in which stocking of trees is from 16.7 to 60 percent.

Nonstocked areas.—Commercial forest land on which stocking of trees is less than 16.7 percent.

Stand-size Classes

Stand.—A growth of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Sawtimber stands.—Stands at least 16.7 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands at least 16.7 percent stocked with growing-stock trees, and with half or more of this stocking in sawtimber and/or poletimber trees and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.—Stands at least 16.7 percent stocked with growing-stock trees and with saplings and/or seedlings comprising more than half of this stocking.

Nonstocked areas.—Commercial forest land on which stocking of growing-stock trees is less than 16.7 percent.

Other Classifications

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Site classes.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood expressed in cubic-foot growth per acre per year.

Stand-age.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal area of all the trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Forest Types

A classification of forest land based upon the species forming a plurality of live-tree stocking. Major forest types in Wisconsin are:

Jack pine.—Forests in which pine species comprise a plurality of the live-tree stocking, with jack pine the most common. (Common associates include aspen, white birch, maple, balsam fir, cherry, and oak.)

Red pine.—Forests in which pine species comprise a plurality of the live-tree stocking, with red pine the most common. (Common associates include aspen, white birch, maple, balsam fir, and red oak).

White pine.—Forests in which pine species comprise a plurality of the live-tree stocking, with eastern white pine the most common. (Common associates include hemlock, aspen, white and yellow birch, and maple.)

Balsam fir-white spruce.—Forests in which balsam fir or white spruce, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include white-cedar, black spruce, tamarack, maple, birch, hemlock, and aspen.)

Black spruce.—Forests in which swamp conifers (black spruce, tamarack, and northern white-cedar) comprise a plurality of the live-tree stocking, with black spruce the most common.

Northern white-cedar.—Forests in which

swamp conifers comprise a plurality of live-tree stocking, with northern white-cedar the most common.

Tamarack.—Forests in which swamp conifers comprise a plurality of live-tree stocking, with tamarack the most common.

Oak-hickory.—Forests in which upland oaks or hickories, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include aspen, cherry, balsam fir, elm, maple, and white birch.)

Elm-ash-cottonwood.—Forests in which lowland elm, ash, or cottonwood, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include maple, basswood, and river birch.) These forests may be subtyped cottonwood when it is the most common species.

Maple-beech-birch. — Forests in which maple, beech, yellow birch, or upland elm, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include hemlock, elm, basswood, white pine, and white and yellow birch.) Locally this type is called "northern hardwoods."

Aspen.—Forests in which a mixture of quaking or bigtooth aspen or balsam poplar, singly or in combination, comprise a plurality of the live-tree stocking. (Common associates include maple, white birch, balsam fir, red and northern pin oak, and cherry.)

Paper birch.—Forests in which paper birch comprises a plurality of the live-tree stocking. (Common associates include aspen, maple, balsam fir, red and northern pin oak, and cherry.)

Timber Volume

Volume of growing stock.—The volume of sound wood in the bole of growing-stock trees 5 inches d.b.h. and over, from a 1-foot stump to a minimum of 4-inch top diameter outside bark, or to the point where the central stem breaks into limbs. Growing-stock volumes are shown in cubic feet. Conversion to standard cords may be accomplished by a factor of 79 cubic feet per solid wood cord.

Volume of sawtimber.—Net volume of the saw log portion of live sawtimber trees in board feet, International 1/4-inch rule, from stump to a minimum 7 inches top diameter outside bark for softwoods and 9 inches for hardwoods.

Upper stem portion.—That part of the bole of sawtimber trees above the merchantable sawtimber top to a minimum top diameter of 4 inches outside bark or to the point where the central stem breaks into limbs.

Growth and Mortality

Net volume growth of growing stock.—The annual change in volume of sound wood in live growing-stock and sawtimber trees and total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber.—The annual change in volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Mortality of growing stock.—The volume of sound wood in growing-stock trees dying annually from natural causes. Natural causes include fire, insects, disease, animal damage, weather, and suppression.

Mortality of sawtimber.—The net board-foot volume of sawtimber trees dying annually from natural causes.

Timber Removals

Timber removals from growing stock.—The volume of sound wood in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other removals. Roundwood products are logs, bolts, or other round sections cut and used from trees. Logging residues are the unused portions of cut trees plus unused trees killed by logging. Other removals are growing-stock trees removed but not utilized for products or trees left standing but "removed" from the commercial forest land classification by land use change — examples are removals from cultural operations such as timber stand improvement work, land clearing, and changes in land use.

Timber removals from sawtimber.—The net board-foot volume of live sawtimber trees removed for forest products annually (including roundwood products and logging residues) and for other removals.

Timber products output.—All timber products cut from roundwood, and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edgings, trimmings, miscuts,

sawdust, shavings, veneer cores and clippings, and pulpmill screenings that are used as pulpwood chips or other products.

Plant byproducts.—Wood products, such as pulpwood chips, obtained incidental to production of other manufactured products. Plant residues.—Wood materials from manufacturing plants not utilized for some product.

PRINCIPAL TREE SPECIES IN WISCONSIN

Softwoods:

White and red pines
- Eastern white pine ..... *Pinus strobus*
- Red pine ..... *Pinus resinosa*

Jack pine ..... *Pinus banksiana*

Spruce and balsam fir:
- White spruce ..... *Picea glauca*
- Black spruce ..... *Picea mariana*
- Balsam fir ..... *Abies balsamea*

Eastern hemlock ..... *Tsuga canadensis*

Other eastern softwoods:
- Tamarack ..... *Larix laricina*
- Northern white-cedar ..... *Thuja occidentalis*

Other softwoods:
- Scotch pine ..... *Pinus sylvestris*
- Eastern redcedar ..... *Juniperus virginiana*
- Norway spruce ..... *Picea abies*

Hardwoods:

White oaks:
- White oak ..... *Quercus alba*
- Bur oak ..... *Quercus macrocarpa*
- Chinkapin oak ..... *Quercus muehlenbergii*
- Swamp white oak ..... *Quercus bicolor*

Select red oaks:
- Northern red oak ..... *Quercus rubra*

Other red oaks:
- Black oak ..... *Quercus velutina*
- Northern pin oak ..... *Quercus ellipsoidalis*

Hickory:
- Bitternut hickory ..... *Carya cordiformis*
- Shagbark hickory ..... *Carya ovata*

Yellow birch ..... *Betula alleghaniensis*

Hard maple:
- Black maple ..... *Acer nigrum*
- Sugar maple ..... *Acer saccharum*

Soft maple:
- Red maple ..... *Acer rubrum*
- Silver maple ..... *Acer saccharinum*

American beech ..... *Fagus grandifolia*

Ash:
- Black ash ..... *Fraxinus nigra*
- White ash ..... *Fraxinus americana*
- Green ash ..... *Fraxinus pennsylvanica*

Cottonwood and aspen:
- Balsam poplar ..... *Populus balsamifera*
- Bigtooth aspen ..... *Populus grandidentata*
- Quaking aspen ..... *Populus tremuloides*
- Eastern cottonwood ..... *Populus deltoides*

American basswood ..... *Tilia americana*
Black walnut ..... *Juglans nigra*
Black cherry ..... *Prunus serotina*
American elm ..... *Ulmus americana*
Rock elm ..... *Ulmus thomasii*
Slippery elm ..... *Ulmus rubra*
Paper birch ..... *Betula papyrifera*
Butternut ..... *Juglans cinerea*

Other hardwoods:
- Hackberry ..... *Celtis occidentalis*
- American sycamore ..... *Platanus occidentalis*
- Red mulberry ..... *Morus rubra*
- Blackgum ..... *Nyssa sylvatica*
- Black willow ..... *Salix nigra*
- Boxelder ..... *Acer negundo*
- Honeylocust ..... *Gleditsia triacanthos*
- Black locust ..... *Robinia pseudoacacia*
- River birch ..... *Betula nigra*
- Northern catalpa ..... *Catalpa speciosa*

Table 4.--Area of commercial forest land by forest type and stand-size class, Wisconsin, 1979[1/]

(In thousand acres)

Forest type	All stands	Stand-size class			
		Sawtimber	Poletimber	Restocking	Nonstocked
Jack pine	717	38	373	306	--
Red pine	332	66	134	132	--
White pine	159	107	23	29	--
Black spruce	215	7	38	170	--
Balsam fir-white spruce	602	59	368	174	--
Northern white-cedar	308	47	187	74	--
Tamarack	222	5	92	126	--
Oak-hickory	2,681	1,033	1,059	590	--
Elm-ash-cottonwood	1,163	353	505	305	--
Maple-beech-birch	3,550	1,347	1,632	572	--
Aspen	3,652	155	1,891	1,606	--
Paper birch	550	20	361	169	--
Nonstocked	326	--	--	--	326
All types	14,478	3,235	6,664	4,253	326

[1/]Table may not add to total due to rounding.

Table 5.--Area of commercial forest land by forest type and stand-age class, Wisconsin, 1979[1/]

(In thousand acres)

Forest type	All classes	Stand-age class										
		0-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Jack pine	717	120	131	173	217	55	15	6	0	0	0	0
Red pine	332	73	64	124	20	8	17	17	4	2	2	0
White pine	159	18	12	10	13	19	17	23	12	14	10	11
Black spruce	215	13	11	22	48	56	30	17	6	2	8	2
Balsam fir-white spruce	602	42	64	62	106	183	94	20	11	2	14	3
Northern white-cedar	308	16	12	12	15	51	54	35	21	47	23	23
Tamarack	222	40	35	17	11	41	39	19	12	3	5	0
Oak-hickory	2,681	270	155	137	374	410	317	233	187	183	326	89
Elm-ash-cottonwood	1,163	126	80	96	145	133	154	150	73	77	101	30
Maple-beech-birch	3,550	172	171	226	502	687	564	287	216	183	325	217
Aspen	3,652	939	539	502	1,032	480	116	27	8	4	4	2
Paper birch	550	83	51	78	132	120	58	17	2	7	1	0
Nonstocked	326	326	--	--	--	--	--	--	--	--	--	--
All types	14,478	2,238	1,326	1,459	2,613	2,243	1,475	851	553	526	820	374

[1/]Table may not add to total due to rounding.

Table 6.--Number of live trees on commercial forest land by species and diameter class, Wisconsin, 1979[1/]

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:															
White pine	64,831	(21,683)	(11,863)	8,172	7,012	3,981	3,652	2,363	1,915	1,385	1,166	687	779	171	3
Red pine	124,743	(12,942)	(30,928)	45,552	20,173	8,621	2,797	1,209	1,033	807	410	197	75	0	0
Jack pine	276,217	(47,128)	(88,171)	75,080	40,322	18,202	5,576	1,258	402	66	12	0	0	0	0
White spruce	35,147	(7,974)	(8,737)	6,676	5,088	3,055	2,041	807	531	168	37	22	8	2	0
Black spruce	168,451	(63,101)	(65,258)	30,775	7,413	1,487	363	35	7	12	0	0	0	0	0
Balsam fir	366,823	(162,084)	(92,840)	61,409	31,000	13,605	4,232	1,240	338	42	34	0	0	0	0
Hemlock	41,945	(10,534)	(7,057)	4,673	4,970	4,516	3,257	2,300	1,908	1,348	642	384	339	18	0
Tamarack	57,760	(9,146)	(18,024)	17,030	9,737	2,534	891	272	90	31	4	0	0	0	0
N. white-cedar	192,668	(50,332)	(42,822)	45,371	29,551	14,100	6,436	2,585	983	377	73	23	14	0	0
Other softwoods	968	(0)	(316)	379	153	92	15	13	0	0	0	0	0	0	0
Total	1,329,554	(384,923)	(366,016)	295,117	155,419	70,192	29,259	12,083	7,208	4,237	2,378	1,314	1,215	191	3
HARDWOODS:															
White oak	122,735	(33,300)	(25,187)	20,821	15,539	9,949	7,154	4,758	2,659	1,670	812	435	382	64	5
Select red oak	139,156	(16,238)	(16,361)	28,669	29,783	19,246	11,955	6,569	4,452	2,654	1,459	881	753	133	3
Other red oak	150,116	(23,330)	(32,983)	33,137	25,520	15,302	8,700	5,297	2,794	1,432	826	396	357	41	0
Hickory	44,907	(18,155)	(10,640)	6,112	4,988	2,523	1,600	579	241	51	10	7	0	0	0
Yellow birch	73,918	(25,824)	(17,937)	11,286	7,154	4,863	2,567	1,616	1,039	786	395	205	222	21	0
Hard maple	633,195	(249,899)	(190,190)	96,939	49,096	20,028	11,071	6,321	3,978	2,586	1,403	823	747	107	5
Soft maple	521,311	(224,942)	(144,381)	80,540	37,697	17,219	7,706	4,549	1,950	1,025	672	296	261	67	7
Beech	4,553	(2,631)	(221)	403	99	294	286	220	151	89	88	22	44	6	0
Ash	179,606	(55,315)	(41,377)	36,962	24,149	10,987	6,059	2,851	1,211	389	136	99	68	4	0
Balsam poplar	3,328	(666)	(675)	390	516	407	196	118	242	47	35	27	9	0	0
Cottonwood	1,586	(0)	(435)	374	217	120	116	134	47	44	13	23	30	27	4
Paper birch	364,664	(96,078)	(97,604)	82,508	55,733	22,241	7,490	2,156	636	153	28	22	15	1	0
Bigtooth aspen	75,441	(6,505)	(12,023)	(14,880)	17,748	13,406	7,073	2,567	901	246	67	18	6	0	0
Quaking aspen	434,933	(87,780)	(104,314)	(93,861)	70,960	43,755	22,122	8,172	2,881	864	186	33	6	0	0
Basswood	108,064	(3,141)	(20,188)	31,423	24,597	13,925	7,224	3,538	1,879	1,122	507	229	246	36	9
Rutternut	3,345	(496)	(489)	186	710	505	545	260	89	46	16	0	3	0	0
Black walnut	874	(0)	(0)	133	164	300	143	58	15	44	10	0	7	0	0
Black cherry	50,582	(19,902)	(11,847)	9,611	5,455	2,274	981	350	100	40	12	4	5	0	0
Elm	150,345	(38,725)	(35,551)	25,544	17,798	12,416	7,749	4,695	3,380	1,931	1,096	619	672	151	18
Other hardwoods	9,331	(2,840)	(1,291)	1,536	1,218	1,014	617	339	241	148	36	29	21	2	0
Noncommercial species	266,056	(206,093)	(45,597)	10,639	2,636	729	294	62	0	7	0	0	0	0	0
Total	3,338,046	(1,111,861)	(809,291)	585,956	391,777	211,503	111,647	55,209	28,888	15,374	7,806	4,169	3,855	660	50
All species	4,667,600	(1,496,784)	(1,175,307)	881,072	547,196	281,695	140,906	67,292	36,095	19,611	10,184	5,482	5,070	851	53

[1/]Table may not add to total due to rounding. Figures in parentheses may be misleading due to the lack of ingrowth.

Table 7.--Number of growing-stock trees on commercial forest land by species and diameter class, Wisconsin, 1968[1/]

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:															
White pine	94,307	48,062	17,281	9,335	5,546	4,092	3,364	2,170	1,779	1,150	680	386	382	78	3
Red pine	143,480	50,316	47,743	23,883	10,811	5,107	2,193	1,587	979	536	229	64	31	0	0
Jack pine	314,073	123,710	88,367	63,960	28,284	7,417	1,781	472	64	18	0	0	0	0	0
White spruce	45,512	19,443	12,883	6,024	3,981	1,710	826	368	218	39	12	7	2	0	0
Black spruce	192,250	104,273	59,381	22,913	4,485	1,050	103	33	7	5	0	0	0	0	0
Balsam fir	586,133	325,102	152,817	73,184	25,753	7,226	1,561	421	69	0	0	0	0	0	0
Hemlock	51,976	16,599	8,378	6,615	6,125	4,613	3,474	2,397	1,714	1,065	484	259	239	15	0
Tamarack	119,555	53,368	37,876	18,857	7,359	1,424	563	66	42	0	0	0	0	0	0
N. white-cedar	232,681	89,038	68,084	41,554	19,914	9,007	3,354	1,100	455	113	42	14	8	0	0
Other softwoods	4,196	1,991	2,032	139	34	0	0	0	0	0	0	0	0	0	0
Total	1,784,161	831,901	494,842	266,463	112,291	41,646	17,219	8,614	5,326	2,926	1,446	730	662	94	3
HARDWOODS:															
White oak	104,079	26,830	28,592	18,342	11,345	7,822	5,164	2,885	1,663	821	321	149	137	9	1
Select red oak	185,709	36,090	42,120	38,902	28,022	17,186	8,904	6,279	3,836	1,962	1,311	552	485	60	0
Other red oak	105,647	23,828	29,875	22,570	13,046	7,155	4,145	2,468	1,209	637	367	175	154	17	0
Hickory	54,680	26,349	13,966	7,444	3,381	2,244	771	360	140	17	8	0	0	0	0
Yellow birch	84,633	37,002	20,316	11,574	6,400	3,939	2,224	1,188	942	540	223	148	121	17	0
Hard maple	888,418	543,655	198,031	78,540	34,235	15,167	7,753	4,578	2,870	1,634	1,010	470	434	41	0
Soft maple	709,795	396,719	195,655	70,268	26,087	11,539	4,730	2,543	1,099	546	365	103	117	20	4
Beech	10,977	8,917	510	422	206	253	231	123	134	97	36	30	18	0	0
Ash	315,602	155,954	75,929	45,004	22,027	9,264	4,290	1,949	762	232	86	65	38	3	0
Balsam poplar	12,634	7,166	1,747	1,591	744	663	308	243	75	46	27	22	4	0	0
Cottonwood	1,211	0	206	145	323	237	107	31	62	26	22	7	23	17	4
Paper birch	461,299	167,030	143,202	95,779	38,539	12,524	3,132	807	204	56	4	17	5	0	0
Bigtooth aspen	190,247	70,083	40,295	35,454	24,684	12,412	4,885	1,641	586	165	31	9	3	0	0
Quaking aspen	998,129	498,091	219,915	144,845	82,847	36,639	11,577	3,155	857	170	32	0	0	0	0
Basswood	176,312	46,889	49,023	37,429	21,629	11,771	4,736	2,506	1,234	597	256	136	100	5	0
Butternut	3,064	502	451	759	262	562	298	157	41	21	9	0	0	0	0
Black walnut	1,096	0	355	112	309	104	99	43	51	16	4	3	0	0	0
Black cherry	51,634	24,058	13,664	7,692	4,032	1,324	507	186	108	46	0	9	6	0	0
Elm	182,923	67,149	41,928	27,731	18,273	11,430	6,879	4,188	2,478	1,227	749	398	403	87	4
Other hardwoods	14,121	7,401	3,081	1,437	843	498	378	159	153	92	49	17	14	0	0
Noncommercial species	202	202	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4,552,413	2,143,916	1,118,861	646,038	337,234	162,736	71,119	35,487	18,504	8,947	4,910	2,309	2,062	276	13
All species	6,336,574	2,975,817	1,613,703	912,501	449,524	204,382	88,338	44,101	23,830	11,873	6,356	3,039	2,724	370	16

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

Table 8.--Number of growing-stock trees on commercial forest land by species and diameter class, Wisconsin, 1979[1/]

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:															
White pine	58,081	(20,757)	(10,666)	6,650	6,060	3,293	3,100	2,057	1,672	1,311	1,062	599	699	152	3
Red pine	120,546	(11,770)	(29,817)	44,424	19,855	8,246	2,768	1,180	1,024	807	393	191	71	0	0
Jack pine	234,703	(37,206)	(75,773)	65,155	35,517	15,285	4,513	958	261	23	12	0	0	0	0
White spruce	34,297	(7,759)	(8,506)	6,454	5,088	3,013	1,955	783	520	148	37	22	8	2	0
Black spruce	152,424	(55,675)	(58,783)	28,838	7,270	1,440	363	35	7	12	0	0	0	0	0
Balsam fir	347,644	(149,438)	(89,057)	59,806	30,396	13,206	4,106	1,229	331	42	34	0	0	0	0
Hemlock	36,567	(8,373)	(6,440)	3,831	4,285	4,140	3,001	2,148	1,811	1,250	566	380	330	14	0
Tamarack	52,333	(7,352)	(15,967)	16,472	9,127	2,321	818	198	60	17	0	0	0	0	0
N. white-cedar	172,046	(44,158)	(39,770)	41,297	25,966	11,790	5,578	2,204	887	298	60	23	14	0	0
Other softwoods	790	(0)	(316)	379	61	34	0	0	0	0	0	0	0	0	0
Total	1,209,431	(342,489)	(335,095)	273,307	143,626	62,768	26,201	10,793	6,574	3,907	2,163	1,215	1,123	168	3
HARDWOODS:															
White oak	72,551	(13,693)	(13,722)	13,777	11,516	6,918	5,383	3,462	1,868	1,187	523	275	209	18	1
Select red oak	117,857	(10,266)	(11,565)	25,726	27,176	17,511	10,649	5,857	4,049	2,369	1,260	729	620	79	1
Other red oak	71,085	(7,997)	(10,396)	17,730	14,896	8,198	4,931	3,274	1,701	942	522	254	224	19	0
Hickory	33,597	(10,707)	(8,986)	5,418	4,337	2,148	1,284	472	189	43	10	3	0	0	0
Yellow birch	50,811	(16,982)	(11,260)	8,205	5,229	3,830	1,961	1,205	889	626	311	162	137	14	0
Hard maple	505,060	(187,886)	(155,336)	81,335	42,220	16,308	9,126	5,228	3,216	2,059	1,127	661	502	54	1
Soft maple	358,211	(127,666)	(106,869)	66,803	30,633	13,733	5,810	3,526	1,551	730	474	217	171	24	3
Beech	2,974	(1,908)	(0)	288	28	177	234	95	110	58	36	11	29	0	0
Ash	146,312	(37,931)	(32,800)	33,828	22,091	10,140	5,327	2,592	1,054	345	86	74	44	2	0
Balsam poplar	2,737	(444)	(675)	390	378	292	156	108	193	35	35	27	5	0	0
Cottonwood	984	(0)	(0)	258	217	120	102	115	47	44	13	23	18	22	4
Paper birch	313,435	(72,983)	(84,629)	74,508	51,658	20,468	6,674	1,820	522	125	24	14	12	0	0
Bigtooth aspen	69,308	(5,067)	(10,275)	(13,616)	17,023	12,988	6,789	2,455	829	208	38	15	6	0	0
Quaking aspen	367,383	(73,537)	(83,279)	(78,693)	63,638	39,011	19,324	6,835	2,306	621	121	20	0	0	0
Basswood	95,646	(1,555)	(16,769)	28,660	22,489	13,023	6,644	3,177	1,632	939	421	174	154	9	0
Butternut	1,776	(245)	(235)	53	520	258	299	101	31	29	6	0	0	0	0
Black walnut	574	(0)	(0)	63	133	172	91	46	15	44	10	0	0	0	0
Black cherry	21,481	(5,540)	(3,588)	5,998	3,803	1,529	676	225	79	27	12	0	3	0	0
Elm	103,179	(19,107)	(22,195)	20,569	14,860	10,165	6,428	3,798	2,663	1,513	833	477	473	86	11
Other hardwoods	5,336	(858)	(1,031)	1,159	833	538	385	187	189	98	30	19	9	0	0
Noncommercial species	0	(0)	(0)	0	0	0	0	0	0	0	0	0	0	0	0
Total	2,340,298	(594,372)	(573,609)	477,077	333,678	177,529	92,270	44,578	23,132	12,041	5,892	3,154	2,618	326	21
All species	3,549,729	(936,860)	(908,705)	750,384	477,304	240,297	118,471	55,371	29,706	15,948	8,055	4,369	3,741	494	24

[1/]Table may not add to total due to rounding. Figures in parentheses may be misleading due to the lack of ingrowth.

Table 9.--Number of short-log trees on commercial forest land by species and diameter class, Wisconsin, 1979[1/]

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:											
White pine	335	15	75	103	53	10	29	29	16	6	0
Red pine	45	0	29	13	0	0	0	0	3	0	0
Jack pine	237	16	161	45	14	0	0	0	0	0	0
White spruce	7	0	0	0	0	7	0	0	0	0	0
Black spruce	16	16	0	0	0	0	0	0	0	0	0
Balsam fir	13	0	13	0	0	0	0	0	0	0	0
Hemlock	173	34	80	35	8	0	9	4	0	2	0
Tamarack	96	22	11	56	7	0	0	0	0	0	0
N. white-cedar	410	210	157	27	8	9	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0
Total	1,332	313	526	279	89	27	39	33	19	7	0
HARDWOODS:											
White oak	1,455	--	298	488	291	142	106	67	58	4	0
Select red oak	775	--	126	212	125	118	80	52	45	16	0
Other red oak	1,535	--	272	483	378	189	139	38	36	0	0
Hickory	100	--	39	52	8	0	0	0	0	0	0
Yellow birch	189	--	48	84	7	23	9	4	13	0	0
Hard maple	998	--	174	314	194	144	69	47	51	6	0
Soft maple	560	--	51	204	135	79	47	11	26	5	3
Beech	92	--	0	40	18	6	16	4	7	0	0
Ash	271	--	123	58	25	19	21	11	14	0	0
Balsam poplar	23	--	0	0	23	0	0	0	0	0	0
Cottonwood	30	--	0	19	0	0	0	0	9	2	0
Paper birch	297	--	120	125	41	7	0	3	0	0	0
Bigtooth aspen	101	--	41	29	19	7	5	0	0	0	0
Quaking aspen	287	--	13	156	85	33	0	0	0	0	0
Basswood	439	--	73	126	118	51	22	10	35	4	1
Butternut	75	--	0	55	10	5	5	0	0	0	0
Black walnut	11	--	0	11	0	0	0	0	0	0	0
Black cherry	85	--	34	33	7	7	0	4	0	0	0
Elm	1,097	--	25	359	290	194	106	51	52	21	0
Other hardwoods	81	--	0	68	0	11	0	0	2	0	0
Noncommercial species	0	--	0	0	0	0	0	0	0	0	0
Total	8,501	--	1,438	2,917	1,772	1,035	625	304	348	58	4
All species	9,833	313	1,964	3,196	1,861	1,061	663	337	367	65	4

[1/]Table may not add to total due to rounding.

Table 10.--Number of growing-stock mortality trees on commercial forest land by species and diameter class, Wisconsin, 1968-1979[1/]

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0 14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:															
White pine	20,057	15,775	3,282	251	242	197	185	33	39	15	16	12	4	5	0
Red pine	5,691	4,477	855	241	71	39	0	9	0	0	0	0	0	0	0
Jack pine	44,854	29,045	9,229	3,873	1,818	688	157	37	8	0	0	0	0	0	0
White spruce	5,424	3,951	701	335	244	86	63	17	20	6	0	0	0	0	0
Black spruce	23,416	16,532	5,163	1,343	298	51	11	18	0	0	0	0	0	0	0
Balsam fir	152,624	101,608	32,300	11,924	4,919	1,371	319	155	27	0	0	0	0	0	0
Hemlock	8,459	6,412	940	227	281	175	134	125	73	60	17	4	8	2	0
Tamarack	61,519	39,924	16,128	4,103	1,081	172	89	23	0	0	0	0	0	0	0
N. white-cedar	33,107	22,366	7,498	1,957	892	231	136	9	0	12	4	3	0	0	0
Other softwoods	1,477	1,477	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	356,628	241,567	76,095	24,254	9,845	3,010	1,093	427	167	93	37	19	13	7	0
HARDWOODS:															
White oak	9,652	2,886	4,077	1,179	625	490	237	79	46	18	10	0	3	2	0
Select red oak	26,687	14,900	5,405	2,930	1,217	865	496	359	216	118	83	65	25	9	0
Other red oak	20,369	7,978	7,831	2,071	1,254	534	334	174	65	72	23	14	14	4	0
Hickory	7,962	5,332	1,679	771	108	14	48	10	0	0	0	0	0	0	0
Yellow birch	24,911	14,666	5,793	2,585	945	367	250	144	55	64	16	10	7	9	0
Hard maple	325,092	292,990	25,053	3,613	1,731	742	377	193	191	93	52	27	30	0	0
Soft maple	182,878	141,857	29,961	7,266	2,210	959	308	206	66	20	17	4	3	1	1
Beech	5,554	4,790	222	230	61	53	39	33	39	56	17	14	0	0	0
Ash	101,160	70,894	18,027	7,355	3,036	1,208	327	190	74	11	8	17	11	2	0
Balsam poplar	6,874	5,594	231	484	184	146	106	87	33	3	0	3	3	0	0
Cottonwood	55	0	0	0	26	0	13	0	5	6	0	0	3	2	0
Paper birch	49,399	31,393	11,667	4,029	1,757	427	121	0	6	0	0	0	0	0	0
Bigtooth aspen	78,209	48,501	12,449	7,474	4,985	2,664	1,236	550	243	94	4	7	0	0	0
Quaking aspen	473,831	331,056	74,903	35,114	18,506	9,160	3,468	1,209	301	111	4	0	0	0	0
Basswood	70,664	39,528	24,121	4,273	1,451	623	331	143	120	15	34	10	13	2	0
Butternut	588	0	0	122	101	158	98	62	16	22	9	0	0	0	0
Black walnut	497	0	278	77	47	0	47	18	23	0	4	3	0	0	0
Black cherry	20.863	11,274	4,911	2,543	1,448	372	154	83	35	33	0	9	3	0	0
Elm	49,778	32,196	7,748	4,728	2,100	1,003	860	525	244	181	88	56	38	11	0
Other hardwoods	7,977	5,252	1,984	205	197	91	159	8	13	30	29	0	8	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1,463,000	1,061,087	236,339	87,048	41,988	19,874	9,007	4,075	1,793	945	398	240	162	43	1
All species	1,819,629	1,302,654	312,435	111,302	51,834	22,884	10,100	4,501	1,960	1,039	435	259	175	50	1

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively

Table 11.--Number of growing-stock removal trees on commercial forest land by species and diameter class, Wisconsin, 1968-1979[1/]

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:															
White pine	16,169	7,087	3,566	1,438	1,173	915	599	566	257	246	148	58	93	22	1
Red pine	17,242	3,009	4,780	4,036	2,703	1,083	491	536	350	173	45	21	15	0	0
Jack pine	34,516	2,170	5,382	12,005	9,948	3,698	971	277	54	11	0	0	0	0	0
White spruce	5,792	2,396	1,806	955	340	143	108	25	10	5	4	0	0	0	0
Black spruce	16,410	3,844	9,074	2,446	895	128	24	0	0	0	0	0	0	0	0
Balsam fir	85,865	44,202	25,301	9,635	4,612	1,577	477	55	7	0	0	0	0	0	0
Hemlock	6,950	1,167	1,030	1,228	1,305	840	635	325	169	141	54	36	19	2	0
Tamarack	5,703	803	4,353	275	218	22	13	19	0	0	0	0	0	0	0
N. white-cedar	27,528	13,337	13,656	162	172	157	31	4	9	0	0	0	0	0	0
Other softwoods	1,929	514	1,415	0	0	0	0	0	0	0	0	0	0	0	0
Total	218,102	78,528	70,362	32,179	21,366	8,563	3,349	1,806	856	575	250	114	127	24	1
HARDWOODS:															
White oak	21,877	7,560	10,185	1,389	633	772	650	262	220	144	25	24	14	0	0
Select red oak	41,165	8,656	18,034	4,773	2,576	1,927	1,343	1,274	1,106	617	406	228	195	28	1
Other red oak	14,193	4,121	8,843	696	180	194	92	48	15	0	0	3	0	0	0
Hickory	13,122	9,082	3,696	70	153	70	25	19	7	0	0	0	0	0	0
Yellow birch	8,911	2,703	3,653	817	559	540	233	195	90	70	8	20	22	1	0
Hard maple	58,266	32,424	11,536	5,622	4,132	2,660	565	501	309	192	138	60	101	26	0
Soft maple	168,706	101,339	54,314	7,063	4,032	1,267	363	171	55	54	30	11	5	2	0
Beech	2,449	1,997	222	92	66	16	21	25	0	5	0	3	2	0	0
Ash	68,131	39,986	21,485	3,790	1,528	925	246	72	54	32	8	0	5	0	0
Balsam poplar	3,023	222	1,206	583	431	314	153	64	28	13	2	3	4	0	0
Cottonwood	172	0	0	0	84	61	0	11	8	6	0	0	2	0	0
Paper birch	98,464	43,950	39,364	8,629	4,447	1,701	282	77	14	0	0	0	0	0	0
Bigtooth aspen	42,730	9,680	14,315	7,424	6,658	3,037	1,225	295	71	21	4	0	0	0	0
Quaking aspen	156,914	16,186	47,262	36,920	32,058	16,410	5,938	1,610	474	45	4	7	0	0	0
Basswood	10,002	2,151	1,510	1,727	2,583	1,376	256	213	109	33	16	14	14	0	0
Butternut	699	257	217	85	21	90	15	8	6	0	0	0	0	0	0
Black walnut	25	0	0	0	25	0	0	0	0	0	0	0	0	0	0
Black cherry	9,289	4,658	3,457	219	676	210	44	9	15	0	0	0	0	0	0
Elm	29,967	8,840	5,456	4,383	3,710	3,091	2,003	1,173	545	292	198	127	129	17	1
Other hardwoods	808	475	216	0	48	21	12	6	11	14	3	3	0	0	0
Noncommercial species	202	202	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	749,115	294,489	244,972	84,284	64,597	34,680	13,467	6,033	3,137	1,537	843	503	496	74	2
All species	967,217	373,017	315,334	116,463	85,963	43,243	16,817	7,840	3,994	2,111	1,093	617	623	98	3

[1/] Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively. Data presented are growing-stock removals for products.

Table 12.--Net volume of all live trees on commercial forest land by species and diameter class, Wisconsin, 1979[1/]

(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:													
White pine	525,006	19,812	32,777	31,985	49,665	49,606	56,860	57,308	62,298	46,682	81,624	34,754	1,635
Red pine	453,147	106,092	94,596	75,498	41,228	27,590	33,290	34,924	21,258	12,655	6,017	0	0
Jack pine	616,064	183,726	189,809	143,515	67,305	21,576	8,446	1,217	470	0	0	0	0
White spruce	155,152	18,208	27,924	28,533	31,107	18,789	17,984	7,344	2,339	1,882	774	269	0
Black spruce	147,030	88,318	38,614	13,589	5,042	716	183	569	0	0	0	0	0
Balsam fir	552,472	164,294	159,449	122,800	63,119	28,013	11,061	1,775	1,960	0	0	0	0
Hemlock	366,835	11,033	21,770	34,949	41,240	44,966	55,340	54,379	33,564	29,112	37,140	3,343	0
Tamarack	148,925	51,252	52,044	23,669	13,045	5,360	2,438	948	168	0	0	0	0
N. white-cedar	500,544	115,807	129,085	99,285	70,639	43,371	24,595	11,709	3,235	1,377	1,441	0	0
Other softwoods	2,332	1,193	443	496	77	124	0	0	0	0	0	0	0
Total	3,467,508	759,734	746,511	574,319	382,466	240,111	210,197	170,174	125,290	91,709	126,996	38,366	1,635
HARDWOODS:													
White oak	544,778	48,771	67,999	72,826	85,551	82,911	61,581	50,067	29,503	19,417	21,375	4,173	604
Select red oak	1,115,306	96,130	163,556	169,049	157,659	127,331	120,186	94,982	65,792	48,833	57,010	14,289	489
Other red oak	600,068	82,180	100,283	92,552	82,528	77,019	56,174	38,959	29,800	17,080	20,242	3,253	0
Hickory	133,873	27,538	37,493	27,971	22,777	10,878	5,337	1,344	294	242	0	0	0
Yellow birch	233,347	20,970	25,388	33,349	29,055	27,232	27,058	27,139	17,060	10,581	13,453	2,062	0
Hard maple	1,264,949	245,858	229,310	155,021	137,829	119,906	105,669	91,702	65,832	48,915	55,131	9,463	314
Soft maple	903,752	233,540	187,722	141,503	95,202	84,455	52,486	34,463	29,213	16,195	19,735	7,533	1,705
Beech	24,985	962	500	2,138	3,611	3,207	3,888	2,732	3,362	1,035	3,332	218	0
Ash	567,116	127,249	136,119	98,490	82,044	57,421	34,008	14,738	5,717	5,742	5,230	360	0
Balsam poplar	24,586	1,451	2,975	4,157	2,904	2,696	6,205	1,461	1,352	984	400	0	0
Cottonwood	26,486	1,608	1,422	1,225	1,543	2,568	1,386	1,697	766	1,692	2,937	7,213	2,432
Paper birch	974,797	261,695	319,390	213,978	108,635	44,625	17,604	5,723	1,334	866	792	153	0
Bigtooth aspen	506,412	46,941	107,433	142,005	113,769	58,204	26,155	8,274	2,320	929	381	0	0
Quaking aspen	1,762,798	297,911	426,607	434,403	329,074	165,199	75,034	26,418	6,756	1,196	201	0	0
Basswood	701,185	99,450	138,931	131,690	103,845	74,286	52,998	40,938	23,692	12,855	18,058	2,815	1,627
Butternut	23,891	829	4,018	4,120	6,507	4,319	2,036	1,348	544	0	171	0	0
Black walnut	9,859	533	1,010	2,568	1,903	1,118	488	1,438	455	0	346	0	0
Black cherry	102,006	32,098	28,326	17,903	12,435	6,128	2,622	1,300	590	255	350	0	0
Elm	796,920	86,264	99,274	106,294	99,272	89,095	88,127	67,586	50,162	35,334	52,373	19,173	3,965
Other hardwoods	43,369	4,526	5,838	6,599	6,612	5,486	5,767	4,397	1,494	1,376	1,014	258	0
Noncommercial species	38,976	24,848	8,580	3,192	1,802	458	0	95	0	0	0	0	0
Total	10,399,459	1,741,352	2,092,175	1,861,033	1,484,555	1,044,543	744,808	516,800	336,037	223,529	272,531	70,963	11,134
All species	13,866,967	2,501,085	2,838,686	2,435,351	1,867,021	1,284,653	955,005	686,974	461,327	315,238	399,527	109,330	12,769

[1/]Table may not add to total due to rounding.

Table 13.--Net volume of growing stock on commercial forest land by species and diameter class, Wisconsin, 1968[1/]

(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:													
White pine	419,605	25,888	27,812	36,539	49,004	46,900	55,196	49,372	37,880	28,992	43,209	17,646	1,169
Red pine	292,901	51,766	52,932	45,689	32,895	36,440	31,503	22,658	12,170	4,303	2,544	0	0
Jack pine	414,151	171,075	142,772	64,217	24,502	9,200	1,803	581	0	0	0	0	0
White spruce	88,091	17,494	22,388	16,545	12,565	8,332	7,270	1,921	836	516	224	0	0
Black spruce	100,746	65,198	23,219	9,653	1,497	670	252	257	0	0	0	0	0
Balsam fir	417,751	190,006	128,980	64,179	22,593	9,573	2,187	0	0	0	0	0	233
Hemlock	351,941	17,650	29,908	37,918	45,963	48,982	50,964	44,052	28,084	19,662	25,689	3,069	0
Tamarack	118,697	53,397	40,523	13,683	8,328	1,474	1,291	0	0	0	0	0	0
N. white-cedar	349,224	106,462	92,050	69,516	40,875	20,466	12,145	4,029	2,047	960	674	0	0
Other softwoods	441	271	170	0	0	0	0	0	0	0	0	0	0
Total	2,553,549	699,208	560,754	357,939	238,223	182,038	162,612	122,871	81,016	54,432	72,340	20,715	1,402
HARDWOODS:													
White oak	408,583	48,011	57,800	68,961	70,835	56,575	45,077	28,728	14,376	8,055	9,221	811	133
Select red oak	1,029,599	128,042	159,143	158,398	126,997	128,817	108,974	73,845	63,327	33,200	40,465	8,392	0
Other red oak	372,999	61,868	63,735	59,419	52,859	45,434	29,980	21,105	15,961	9,395	11,034	2,209	0
Hickory	113,192	35,115	26,624	27,751	12,174	7,236	3,571	447	275	0	0	0	0
Yellow birch	217,789	24,566	27,653	31,148	29,796	24,470	27,396	20,994	11,127	8,717	9,573	2,350	0
Hard maple	987,331	210,700	168,320	129,700	104,966	93,377	83,735	65,147	53,562	31,715	40,066	6,043	0
Soft maple	683,158	218,397	143,740	106,745	68,368	53,280	31,924	21,644	18,271	6,732	10,316	2,753	988
Beech	24,038	1,368	1,271	2,476	3,247	2,637	3,800	3,926	1,862	1,775	1,676	0	0
Ash	512,806	153,894	125,816	85,920	61,203	40,762	22,174	9,385	4,789	4,349	3,772	742	0
Balsam poplar	32,580	4,668	4,664	7,027	5,203	5,324	2,046	1,636	989	863	159	0	0
Cottonwood	20,708	622	1,933	2,265	1,565	687	1,699	973	1,213	544	2,655	4,513	2,039
Paper birch	712,693	290,921	222,986	123,418	48,137	17,810	6,003	2,181	146	753	337	0	0
Bigtooth aspen	529,056	106,389	149,457	130,285	79,691	37,689	17,325	6,099	1,448	489	185	0	0
Quaking aspen	1,613,260	452,216	498,483	377,532	182,507	70,354	24,895	5,888	1,383	0	0	0	0
Basswood	563,451	110,546	120,504	112,076	71,179	55,034	37,491	24,245	13,021	8,967	9,686	703	0
Butternut	18,769	2,710	1,519	4,991	4,124	3,112	1,179	741	393	0	0	0	0
Black walnut	7,620	308	1,744	959	1,406	893	1,401	554	183	170	0	0	0
Black cherry	75,287	24,781	22,234	11,887	7,048	3,809	2,972	1,744	0	403	408	0	0
Elm	736,343	98,679	108,413	106,840	97,388	86,350	71,316	48,448	38,571	26,331	38,302	14,502	1,202
Other hardwoods	34,265	4,491	4,768	4,610	5,288	3,385	4,341	3,300	2,248	903	932	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	8,693,525	1,978,292	1,910,806	1,552,408	1,033,982	737,037	527,299	341,028	243,145	143,363	178,788	43,017	4,362
All species	11,247,074	2,677,499	2,471,560	1,910,347	1,272,204	919,075	689,911	463,899	324,161	197,795	251,127	63,732	5,764

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

Table 14.--Net volume of growing stock on commercial forest land by species and diameter class Wisconsin, 1979[1/]

(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:													
White pine	496,926	18,987	31,653	30,174	46,711	46,248	53,116	56,066	59,302	43,593	77,147	32,294	1,635
Red pine	449,961	105,302	94,115	74,658	40,996	27,332	33,237	34,924	21,032	12,507	5,858	0	0
Jack pine	585,871	177,108	183,184	136,166	62,182	19,182	6,797	783	470	0	0	0	0
White spruce	154,238	18,113	27,924	28,476	30,879	18,682	17,904	6,996	2,339	1,882	774	269	0
Black spruce	145,699	87,258	38,495	13,438	5,042	716	183	569	0	0	0	0	0
Balsam fir	549,473	163,253	158,822	122,095	62,679	27,963	10,925	1,775	1,960	0	0	0	0
Hemlock	358,173	10,666	21,018	34,102	40,027	43,939	54,393	53,233	32,138	28,930	36,820	2,908	0
Tamarack	145,344	50,882	51,362	23,057	12,735	4,509	2,040	760	0	0	0	0	0
N. white-cedar	480,298	112,970	124,905	93,968	66,999	41,191	23,750	10,683	3,014	1,377	1,441	0	0
Other softwoods	1,757	1,193	263	301	0	0	0	0	0	0	0	0	0
Total	3,367,741	745,732	731,740	556,434	368,248	229,762	202,346	165,789	120,254	88,288	122,040	35,471	1,635
HARDWOODS:													
White oak	453,099	39,532	59,598	61,900	74,748	70,097	50,909	42,002	23,110	14,901	14,542	1,624	137
Select red oak	1,047,957	88,012	156,266	161,977	149,790	120,478	114,857	89,391	60,949	44,105	51,453	10,394	285
Other red oak	444,307	50,411	73,677	68,170	63,106	60,221	43,033	30,724	22,796	13,627	16,069	2,472	0
Hickory	125,806	26,539	35,503	26,572	20,947	9,749	4,802	1,243	294	157	0	0	0
Yellow birch	210,754	18,424	22,239	30,762	26,658	24,437	25,878	24,975	15,664	9,613	10,426	1,679	0
Hard maple	1,143,674	221,750	212,090	140,130	125,739	108,633	94,714	82,244	59,622	44,254	46,520	7,725	254
Soft maple	803,888	213,997	169,769	127,844	84,122	74,709	46,483	29,041	24,284	13,901	15,509	3,413	815
Beech	18,530	735	167	1,686	3,354	1,928	3,277	2,265	1,950	557	2,612	0	0
Ash	537,933	120,290	129,466	95,053	77,074	55,154	32,450	13,913	4,777	5,204	4,258	294	0
Balsam poplar	21,876	1,451	2,366	3,530	2,695	2,583	5,348	1,358	1,352	984	210	0	0
Cottonwood	23,427	1,034	1,422	1,225	1,393	2,233	1,386	1,697	766	1,692	1,909	6,239	2,432
Paper birch	921,356	243,345	305,412	205,641	102,885	40,805	15,572	5,181	1,213	653	648	0	0
Bigtooth aspen	493,820	44,228	105,316	140,135	111,736	57,076	24,950	7,562	1,652	786	381	0	0
Quaking aspen	1,634,232	257,283	401,290	413,898	311,895	153,272	68,268	22,242	5,233	852	0	0	0
Basswood	650,199	88,971	129,141	126,798	99,785	70,285	48,957	37,860	21,766	11,446	14,005	1,185	0
Butternut	14,221	213	2,935	2,514	4,291	2,163	950	936	220	0	0	0	0
Black walnut	7,136	206	789	1,477	1,355	927	488	1,438	455	0	0	0	0
Black cherry	73,280	19,939	21,577	13,687	9,497	4,656	2,139	999	590	0	196	0	0
Elm	702,585	75,176	89,299	96,423	91,549	79,257	77,359	58,500	43,130	30,822	43,924	14,259	2,886
Other hardwoods	34,591	3,814	4,839	4,802	5,324	3,740	5,234	3,648	1,391	1,143	658	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9,362,672	1,515,352	1,923,160	1,724,223	1,367,941	942,400	667,053	457,217	291,214	194,695	223,321	49,285	6,810
All species	12,730,413	2,261,085	2,654,900	2,280,657	1,736,190	1,172,162	869,400	623,006	411,468	282,984	345,361	84,757	8,444

[1/]Table may not add to total due to rounding.

Table 15.--Net volume of sawtimber on commercial forest land by species and diameter class, Wisconsin, 1968[1/]

(In thousand board feet)[2/]

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:											
White pine	2,192,377	214,836	276,800	267,110	319,682	293,698	236,688	179,120	280,459	116,224	7,758
Red pine	1,137,018	313,167	198,386	208,796	176,475	128,106	70,001	26,017	16,070	0	0
Jack pine	492,946	319,490	116,948	44,316	9,019	3,172	0	0	0	0	0
White spruce	232,845	80,120	58,302	38,700	35,110	9,937	4,418	3,837	2,422	0	0
Black spruce	59,899	47,142	6,894	3,458	1,161	1,243	0	0	0	0	0
Balsam fir	463,570	297,104	99,313	41,958	9,936	0	0	0	0	0	15,259
Hemlock	1,742,745	217,638	259,312	275,524	287,920	250,229	160,844	114,498	156,324	20,457	0
Tamarack	100,854	54,642	34,138	6,243	5,831	0	0	0	0	0	0
N. white-cedar	761,676	337,577	210,489	109,645	63,476	22,199	10,390	4,959	2,941	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0
Total	7,183,930	1,881,718	1,260,583	995,750	908,610	708,584	482,341	328,431	458,216	136,681	23,017
HARDWOODS:											
White oak	1,168,804	--	402,124	285,419	210,592	125,427	63,270	36,264	41,708	3,325	675
Select red oak	2,942,320	--	721,533	671,830	540,074	348,920	288,565	149,881	181,704	39,814	0
Other red oak	944,690	--	299,854	234,239	144,048	96,566	72,357	40,202	48,596	8,828	0
Hickory	105,545	--	53,373	31,410	17,032	2,277	1,452	0	0	0	0
Yellow birch	652,073	--	139,251	113,686	128,597	100,543	55,573	45,129	54,732	14,563	0
Hard maple	2,459,335	--	502,076	471,235	435,443	345,365	286,594	169,271	216,359	32,992	0
Soft maple	1,062,558	--	368,436	269,682	153,656	99,800	82,296	28,501	42,613	12,179	5,395
Beech	95,695	--	17,245	13,294	18,776	19,195	9,207	9,130	8,849	0	0
Ash	761,171	--	331,002	211,430	112,566	45,035	21,842	19,352	15,837	4,106	0
Balsam poplar	93,124	--	24,134	27,402	11,706	11,015	7,972	8,496	2,400	0	0
Cottonwood	65,220	--	8,738	3,533	8,516	4,872	5,483	2,053	10,794	15,261	5,970
Paper birch	373,077	--	229,386	88,997	30,902	12,394	1,287	6,556	3,554	0	0
Bigtooth aspen	707,206	--	375,018	187,215	94,459	35,867	9,719	3,603	1,324	0	0
Quaking aspen	1,373,915	--	842,774	349,088	135,562	36,968	9,522	0	0	0	0
Basswood	1,116,390	--	363,481	277,166	189,336	123,270	65,944	46,519	47,314	3,362	0
Butternut	50,626	--	21,920	16,615	5,880	4,117	2,094	0	0	0	0
Black walnut	22,628	--	7,500	4,412	6,604	2,502	824	786	0	0	0
Black cherry	81,091	--	33,770	18,668	15,176	8,871	0	2,232	2,374	0	0
Elm	2,176,778	--	502,596	449,145	378,706	255,090	202,864	134,320	188,574	61,851	3,632
Other hardwoods	105,878	--	28,536	16,683	21,990	17,031	11,609	4,899	5,130	0	0
Noncommercial species	0	--	0	0	0	0	0	0	0	0	0
Total	16,358,122	--	5,272,746	3,741,149	2,659,622	1,695,124	1,198,473	707,195	871,861	196,281	15,671
All species	23,542,052	1,881,718	6,533,328	4,736,899	3,568,232	2,403,708	1,680,813	1,035,626	1,330,077	332,962	38,688

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

[2/]International 1/4-inch rule.

Table 16.--Net volume of sawtimber on commercial forest land by species and diameter class, Wisconsin, 1979[1/]

(In thousand board feet)[2/]

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:											
White pine	2,740,019	172,455	261,722	262,354	307,273	338,021	370,434	286,358	504,210	226,832	10,361
Red pine	1,533,777	510,726	247,943	153,996	185,091	196,262	124,285	76,356	39,118	0	0
Jack pine	1,109,810	678,521	297,068	92,738	34,876	3,870	2,737	0	0	0	0
White spruce	528,835	139,775	143,288	87,781	87,380	35,900	13,465	12,011	5,346	3,891	0
Black spruce	96,958	65,670	23,552	3,950	1,056	2,730	0	0	0	0	0
Balsam fir	1,027,422	563,395	273,416	122,381	49,295	8,809	10,128	0	0	0	0
Hemlock	1,878,634	195,628	226,252	246,066	307,689	302,055	185,895	169,239	226,146	19,664	0
Tamarack	174,167	89,184	52,507	19,448	9,045	3,984	0	0	0	0	0
N. white-cedar	1,226,987	450,960	348,573	214,042	126,542	58,144	15,104	6,991	6,631	0	0
Other softwoods	1,130	1,130	0	0	0	0	0	0	0	0	0
Total	10,317,740	2,867,443	1,874,319	1,202,756	1,108,246	949,774	722,048	550,955	781,451	250,386	10,361
HARDWOODS:											
White oak	1,439,872	--	423,319	352,171	238,477	184,429	99,655	65,894	67,144	8,065	718
Select red oak	3,216,434	--	845,283	626,364	563,340	423,990	278,593	198,120	228,774	50,727	1,244
Other red oak	1,272,287	--	364,162	313,348	206,992	145,524	100,872	60,640	71,609	9,140	0
Hickory	162,880	--	88,554	42,496	22,788	6,545	1,699	798	0	0	0
Yellow birch	679,738	--	123,981	114,429	122,426	120,643	79,241	49,658	58,894	10,466	0
Hard maple	2,946,387	--	604,969	553,431	495,198	439,062	320,116	242,539	248,626	40,902	1,544
Soft maple	1,442,997	--	453,152	382,113	221,807	133,409	108,498	59,892	64,489	15,179	4,458
Beech	81,010	--	17,625	9,792	16,369	11,002	9,581	2,960	13,681	0	0
Ash	992,048	--	414,765	286,861	160,613	67,738	21,496	22,748	16,938	888	0
Balsam poplar	90,774	--	12,723	13,374	31,367	9,066	11,143	10,446	2,656	0	0
Cottonwood	80,837	--	7,838	11,799	6,761	8,119	4,015	7,319	6,812	21,102	7,073
Paper birch	821,713	--	489,922	202,844	83,103	25,917	6,920	5,906	7,101	0	0
Bigtooth aspen	999,069	--	514,519	282,817	135,526	46,417	11,136	5,833	2,820	0	0
Quaking aspen	2,734,997	--	1,433,979	751,604	368,136	138,149	35,925	7,203	0	0	0
Basswood	1,555,976	--	508,626	357,683	249,594	191,399	114,915	57,139	70,369	6,253	0
Butternut	44,043	--	23,006	10,707	4,787	4,552	991	0	0	0	0
Black walnut	22,725	--	7,099	4,666	2,396	6,507	2,057	0	0	0	0
Black cherry	90,266	--	46,763	23,465	10,736	5,132	3,034	0	1,135	0	0
Elm	2,269,495	--	471,937	410,704	408,320	311,486	225,908	158,842	212,594	59,285	10,420
Other hardwoods	108,636	--	28,736	19,168	25,418	18,010	7,395	6,326	3,583	0	0
Noncommercial species	0	--	0	0	0	0	0	0	0	0	0
Total	21,052,186	--	6,880,957	4,769,839	3,374,156	2,297,095	1,443,191	962,260	1,077,225	222,007	25,457
All species	31,369,926	2,867,443	8,755,277	5,972,595	4,482,402	3,246,869	2,165,239	1,513,214	1,858,676	472,393	35,818

1/Table may not add to total due to rounding.

2/International 1/4-inch rule.

Table 17.--Net volume in short-log trees on commercial forest land by species group and diameter class, Wisconsin, 1979[1/]

(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:											
White pine	8,708	211	945	1,828	1,397	334	1,130	1,348	974	541	0
Red pine	529	0	232	137	0	0	0	0	159	0	0
Jack pine	2,295	101	1,354	588	251	0	0	0	0	0	0
White spruce	200	0	0	0	0	200	0	0	0	0	0
Black spruce	106	106	0	0	0	0	0	0	0	0	0
Balsam fir	117	0	117	0	0	0	0	0	0	0	0
Hemlock	2,249	235	678	492	145	0	381	182	0	135	0
Tamarack	1,190	155	98	761	177	0	0	0	0	0	0
N. white-cedar	3,719	1,442	1,507	356	140	273	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0
Total	19,113	2,250	4,933	4,162	2,109	808	1,511	1,530	1,133	676	0
HARDWOODS:											
White oak	28,781	--	3,376	6,967	5,569	3,538	3,262	2,503	3,201	365	0
Select ed oak	20,451	--	1,545	3,340	2,784	3,382	2,845	2,399	2,631	1,526	0
Other oak	30,704	--	2,857	7,077	7,323	5,060	4,742	1,691	1,954	0	0
Hickory	1,332	--	403	755	174	0	0	0	0	0	0
Yellow birch	3,874	--	542	1,155	137	635	301	203	902	0	0
Hard maple	27,237	--	2,246	6,336	4,933	4,663	2,792	2,330	3,413	524	0
Soft maple	16,087	--	634	3,687	3,193	2,475	1,852	615	1,971	827	834
Beech	2,764	--	0	665	374	142	768	321	494	0	0
Ash	5,093	--	1,710	900	426	493	565	314	685	0	0
Balsam poplar	556	--	0	0	556	0	0	0	0	0	0
Cottonwood	1,635	--	0	334	0	0	0	0	866	434	0
Paper birch	4,463	--	1,346	1,926	917	148	0	126	0	0	0
Bigtooth aspen	1,733	--	495	426	400	253	160	0	0	0	0
Quaking aspen	6,180	--	166	2,973	1,912	1,129	0	0	0	0	0
Basswood	12,180	--	854	2,112	2,695	1,557	857	483	2,422	450	751
Butternut	1,601	--	0	956	214	188	243	0	0	0	0
Black walnut	192	--	0	192	0	0	0	0	0	0	0
Black cherry	1,515	--	379	495	198	187	0	255	0	0	0
Elm	31,574	--	263	6,033	6,426	5,931	4,420	2,516	3,797	2,187	0
Other hardwoods	1,439	--	0	1,095	0	253	0	0	90	0	0
Noncommercial species	0	--	0	0	0	0	0	0	0	0	0
Total	199,392	--	16,816	47,426	38,232	30,034	22,805	13,756	22,425	6,313	1,585
All species	218,505	2,250	21,749	51,589	40,341	30,842	24,316	15,286	23,558	6,988	1,585

[1/]Table may not add to total due to rounding.

Table 18.--Net board foot volume in short-log trees on commercial forest land by species group and diameter class, Wisconsin, 1979[1/]

(In thousand board feet)[2/]

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:											
White pine	23,065	432	2,558	4,490	2,961	821	2,823	3,498	3,026	2,456	0
Red pine	2,037	0	983	555	0	0	0	0	499	0	0
Jack pine	8,517	464	5,326	1,929	798	0	0	0	0	0	0
White spruce	499	0	0	0	0	499	0	0	0	0	0
Black spruce	434	434	0	0	0	0	0	0	0	0	0
Balsam fir	445	0	445	0	0	0	0	0	0	0	0
Hemlock	7,524	974	2,589	1,530	409	0	924	519	0	580	0
Tamarack	3,932	653	354	2,478	447	0	0	0	0	0	0
N. white-cedar	13,634	5,947	5,419	1,137	397	735	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0
Total	60,087	8,904	17,673	12,118	5,012	2,055	3,746	4,017	3,525	3,037	0
HARDWOODS:											
White oak	72,792	--	8,967	18,912	13,795	8,363	7,752	5,867	8,046	1,090	0
Select red oak	49,784	--	5,060	9,568	6,793	7,668	6,120	5,200	5,743	3,632	0
Other red oak	81,267	--	11,787	23,016	19,985	11,358	9,316	2,759	3,045	0	0
Hickory	4,762	--	1,739	2,572	450	0	0	0	0	0	0
Yellow birch	10,022	--	1,988	3,942	390	1,389	634	336	1,343	0	0
Hard maple	56,979	--	7,212	14,435	10,739	9,087	5,004	3,912	5,633	956	0
Soft maple	38,133	--	1,932	9,366	7,134	4,975	3,579	885	3,897	2,674	3,690
Beech	3,173	--	0	405	528	133	991	351	765	0	0
Ash	14,098	--	4,378	2,330	1,243	1,243	1,664	1,127	2,113	0	0
Balsam poplar	1,228	--	0	0	1,228	0	0	0	0	0	0
Cottonwood	4,390	--	0	723	0	0	0	0	2,035	1,632	0
Paper birch	13,319	--	4,777	5,626	2,204	424	0	288	0	0	0
Bigtooth aspen	4,272	--	1,198	1,330	949	415	380	0	0	0	0
Quaking aspen	14,409	--	544	7,373	4,495	1,997	0	0	0	0	0
Basswood	25,174	--	2,950	5,735	6,317	3,148	1,533	807	3,432	611	640
Butternut	3,792	--	0	2,590	495	334	373	0	0	0	0
Black walnut	519	--	0	519	0	0	0	0	0	0	0
Black cherry	1,699	--	167	771	126	378	0	257	0	0	0
Elm	53,273	--	1,021	11,725	10,749	8,577	5,814	3,595	5,763	6,030	0
Other hardwoods	1,770	--	0	1,028	0	227	0	0	514	0	0
Noncommercial species	0	--	0	0	0	0	0	0	0	0	0
Total	454,852	--	53,721	121,968	87,617	59,717	43,160	25,385	42,328	16,625	4,331
All species	514,938	8,904	71,394	134,086	92,629	61,772	46,907	29,402	45,853	19,661	4,331

[1/] Table may not add to total due to rounding.

[2/] International 1/4-inch rule.

Table 19.--Net growing-stock volume of mortality trees on commercial forest land by species and diameter class, Wisconsin, 1968-1979[1/]

(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:													
White pine	12,585	885	1,247	2,041	2,632	665	1,263	684	1,028	751	383	1,007	0
Red pine	1,866	970	341	350	0	206	0	0	0	0	0	0	0
Jack pine	28,506	10,544	8,821	5,816	2,429	703	193	0	0	0	0	0	0
White spruce	5,401	920	1,400	855	922	394	648	262	0	0	0	0	0
Black spruce	6,792	3,958	1,761	520	150	403	0	0	0	0	0	0	0
Balsam fir	77,836	30,995	25,125	12,375	4,737	3,507	864	0	0	0	0	0	233
Hemlock	15,126	647	1,362	1,563	1,763	2,734	2,185	2,426	945	270	879	352	0
Tamarack	20,553	11,287	5,785	1,581	1,447	453	0	0	0	0	0	0	0
N. white-cedar	13,979	5,054	4,316	1,977	1,466	197	0	470	259	239	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	182,643	65,259	50,157	27,078	15,546	9,262	5,153	3,842	2,232	1,260	1,262	1,359	233
HARDWOODS:													
White oak	18,257	3,174	3,339	4,202	3,254	1,593	1,227	638	410	0	217	202	0
Select red oak	61,306	9,731	6,946	8,261	7,009	7,326	6,293	4,399	4,105	3,947	1,949	1,341	0
Other red oak	31,384	5,608	6,259	4,397	4,281	3,289	1,687	2,428	1,060	829	980	567	0
Hickory	5,840	3,681	970	212	774	203	0	0	0	0	0	0	0
Yellow birch	25,894	5,526	3,793	3,061	3,472	2,930	1,471	2,397	821	612	545	1,265	0
Hard maple	51,207	9,910	8,804	6,716	5,164	3,866	5,610	3,732	2,823	1,839	2,743	0	0
Soft maple	56,459	22,759	11,606	8,911	4,401	4,149	1,945	860	927	225	274	212	191
Beech	7,922	839	304	525	535	767	1,123	2,212	844	773	0	0	0
Ash	69,111	26,122	17,413	10,890	4,776	3,967	2,196	437	525	1,221	1,115	448	0
Balsam poplar	8,557	1,494	912	1,450	1,574	1,929	861	90	0	80	168	0	0
Cottonwood	1,523	0	206	0	213	0	155	213	0	0	346	390	0
Paper birch	29,226	12,366	10,365	4,306	2,022	0	168	0	0	0	0	0	0
Bigtooth aspen	127,726	23,222	31,125	28,002	20,856	13,058	7,315	3,608	199	340	0	0	0
Quaking aspen	416,645	109,819	115,776	95,932	55,583	26,651	8,722	4,006	156	0	0	0	0
Basswood	42,377	12,435	7,860	5,876	4,884	3,155	3,883	624	1,517	639	1,200	305	0
Butternut	7,009	487	567	1,528	1,486	1,300	442	795	404	0	0	0	0
Black walnut	2,485	200	318	0	633	387	590	0	184	173	0	0	0
Black cherry	26,239	8,025	7,949	3,404	2,195	1,704	1,057	1,267	0	422	215	0	0
Elm	90,022	17,544	12,698	9,371	12,456	10,530	7,070	6,912	4,505	3,501	3,426	2,010	0
Other hardwoods	8,595	596	1,091	982	2,351	177	376	1,152	1,368	0	502	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1,087,783	273,538	248,299	198,026	137,919	86,983	52,192	35,771	19,847	14,601	13,680	6,739	191
All species	1,270,427	338,797	298,456	225,104	153,465	96,245	57,345	39,613	22,079	15,861	14,942	8,098	423

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

Table 20.--Net growing-stock volume of removals on commercial forest land by species and diameter class, Wisconsin, 1968-1979[1/]

(In thousand cubic feet)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.9-22.9	23.0-28.9	29.0-38.9	39.0+
SOFTWOODS:													
White pine	84,460	4,417	5,683	7,891	9,022	12,028	7,998	10,613	8,525	4,070	8,686	5,131	395
Red pine	74,418	9,798	11,887	9,911	7,419	12,154	10,947	7,255	2,420	1,373	1,254	0	0
Jack pine	138,000	34,124	50,151	32,882	13,630	5,435	1,420	358	0	0	0	0	0
White spruce	9,130	2,366	1,848	1,509	2,004	635	305	236	227	0	0	0	0
Black spruce	13,789	7,512	4,731	1,104	442	0	0	0	0	0	0	0	0
Balsam fir	73,593	26,423	24,007	14,551	7,154	1,230	228	0	0	0	0	0	0
Hemlock	51,561	3,243	6,568	6,827	8,507	6,788	5,207	5,811	3,329	2,831	2,101	351	0
Tamarack	2,713	728	1,111	234	211	428	0	0	0	0	0	0	0
N. white-cedar	3,398	504	744	1,361	421	102	267	0	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	451,061	89,116	106,730	76,271	48,810	38,799	26,370	24,273	14,500	8,273	12,041	5,482	395
HARDWOODS:													
White oak	42,282	3,347	3,226	6,858	9,193	5,143	6,050	5,182	1,047	1,247	990	0	0
Select red oak	204,812	14,593	15,313	18,424	19,471	26,975	32,112	23,354	19,804	13,879	16,368	4,254	264
Other red oak	7,194	2,095	941	1,539	1,102	960	389	0	0	168	0	0	0
Hickory	3,056	264	1,125	756	370	363	178	0	0	0	0	0	0
Yellow birch	25,613	1,988	2,741	4,381	3,198	4,137	2,648	2,697	418	1,220	2,045	139	0
Hard maple	120,454	15,634	21,642	22,604	7,941	10,566	9,215	7,834	7,305	4,295	9,683	3,733	0
Soft maple	74,324	23,501	22,761	11,873	5,498	3,827	1,657	2,209	1,596	693	480	228	0
Beech	2,471	292	307	161	357	585	0	226	0	243	300	0	0
Ash	39,564	12,918	8,884	8,657	3,632	1,557	1,565	1,346	414	0	591	0	0
Balsam poplar	13,064	1,767	2,524	3,450	2,333	1,403	757	408	89	116	217	0	0
Cottonwood	2,146	0	552	656	0	187	212	249	0	0	289	0	0
Paper birch	77,563	26,842	27,041	17,309	4,312	1,658	402	0	0	0	0	0	0
Bigtooth aspen	126,702	24,653	41,275	31,157	19,550	6,930	2,084	841	210	0	0	0	0
Quaking aspen	619,234	114,600	192,781	167,784	92,812	35,281	13,700	1,761	176	339	0	0	0
Basswood	51,165	5,483	15,288	12,937	3,895	4,925	3,569	1,585	776	1,000	1,708	0	0
Butternut	1,874	328	152	860	195	158	180	0	0	0	0	0	0
Black walnut	159	0	159	0	0	0	0	0	0	0	0	0	0
Black cherry	7,817	690	3,860	2,014	653	186	414	0	0	0	0	0	0
Elm	183,302	15,315	22,524	28,694	28,851	24,776	16,068	11,602	10,831	8,667	13,075	2,628	269
Other hardwoods	2,054	0	328	169	175	187	347	497	176	174	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1,604,847	264,310	383,424	340,283	203,538	129,804	91,549	59,792	42,842	32,041	45,747	10,983	533
All species	2,055,908	353,426	490,155	416,554	252,348	168,603	117,919	84,065	57,342	40,314	57,788	16,465	928

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively. Data presented are growing-stock removals for products.

Table 21.--Net volume of growing stock on commercial forest land by species and forest type, Wisconsin, 1979[1/]

(In thousand cubic feet)

Species	All types	Forest type												
		Jack pine	Red pine	White pine	Black spruce	Balsam fir-white spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-cottonwood	Maple-beech-birch	Aspen	Paper birch	Nonstocked
SOFTWOODS:														
White pine	496,926	6,604	41,791	167,877	11,439	16,891	5,467	5,910	27,352	25,254	122,257	54,195	11,890	0
Red pine	449,961	27,914	290,667	22,012	3,898	2,579	188	855	20,708	524	8,924	65,210	6,480	0
Jack pine	585,871	436,176	12,263	5,751	1,041	178	522	184	67,925	1,542	1,505	55,819	2,447	517
White spruce	154,238	0	2,729	2,618	2,593	64,714	3,577	2,099	903	12,191	13,430	42,992	5,751	640
Black spruce	145,699	909	1,152	799	62,278	23,671	16,034	19,737	0	3,592	2,551	13,828	1,149	0
Balsam fir	549,473	301	3,249	2,712	3,662	249,412	11,132	10,128	0	40,542	90,918	116,282	20,789	345
Hemlock	358,173	0	623	1,378	0	10,084	5,596	393	442	14,142	320,100	3,115	2,301	0
Tamarack	145,344	0	493	982	7,955	6,080	19,484	75,585	1,839	8,413	2,947	15,633	5,095	839
N. white-cedar	480,298	0	480	3,387	1,720	65,226	243,115	2,660	0	75,570	63,434	17,070	7,636	0
Other softwoods	1,757	301	0	0	0	0	0	0	952	0	263	241	0	0
Total	3,367,741	472,205	353,447	207,516	94,586	438,835	305,115	117,551	120,121	181,769	626,330	384,386	63,539	2,341
HARDWOODS:														
White oak	453,099	277	0	956	0	348	245	0	348,701	16,605	55,461	25,348	4,768	390
Select red oak	1,047,957	2,046	5,924	4,039	666	826	0	249	678,302	11,998	221,420	93,625	28,650	212
Other red oak	444,307	11,486	2,730	1,942	0	0	0	0	386,139	2,003	15,984	20,478	2,160	1,386
Hickory	125,806	0	0	0	0	0	157	0	91,863	904	30,813	913	781	376
Yellow birch	210,754	0	0	0	175	6,472	2,716	0	606	16,823	177,826	3,864	1,838	435
Hard maple	1,143,674	0	863	637	199	6,302	205	303	26,307	16,880	1,041,947	39,832	9,671	528
Soft maple	803,888	0	3,411	4,870	1,368	24,194	3,708	680	64,690	203,231	378,078	93,130	26,526	0
Beech	18,530	0	0	0	0	0	0	0	0	189	18,341	0	0	0
Ash	537,933	0	0	1,135	0	11,261	7,872	0	19,862	270,374	187,543	33,719	4,723	1,445
Balsam poplar	21,876	0	0	0	0	1,394	532	0	983	5,572	3,658	8,387	1,351	0
Cottonwood	23,427	0	0	776	0	0	0	0	1,464	15,626	2,582	2,455	524	0
Paper birch	921,356	2,868	3,610	5,571	3,428	35,151	15,360	5,307	103,959	36,194	203,270	227,577	278,476	586
Bigtooth aspen	493,820	7,450	1,519	2,045	1,023	2,000	0	0	98,261	6,468	48,333	313,002	13,718	0
Quaking aspen	1,634,232	15,273	18,143	14,483	11,439	28,424	11,025	3,772	91,446	58,716	210,545	1,121,711	44,151	5,103
Basswood	650,199	46	0	0	0	1,506	1,070	0	27,792	27,325	565,140	23,186	4,135	0
Butternut	14,221	0	0	0	0	0	0	0	3,550	264	8,468	1,733	206	0
Black walnut	7,136	0	0	0	0	0	0	0	5,595	0	1,540	0	0	0
Black cherry	73,280	0	0	0	0	2,566	0	255	25,339	2,432	25,820	15,778	1,090	0
Elm	702,585	249	0	2,332	0	5,424	7,369	791	43,996	164,454	436,596	34,551	5,139	1,687
Other hardwoods	34,591	0	715	0	0	0	0	0	4,624	16,230	4,307	5,364	3,351	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9,362,672	39,694	36,914	38,786	18,299	125,868	50,259	11,356	2,023,479	872,287	3,637,672	2,064,654	431,257	12,148
All species	12,730,413	511,898	390,361	246,302	112,885	564,703	355,374	128,907	2,143,599	1,054,056	4,264,003	2,449,040	494,796	14,489

[1/] Table may not add to total due to rounding.

Table 22.--Net volume of sawtimber on commercial forest land by species and forest type, Wisconsin, 1979[1/]

(In thousand board feet)[2/]

Species	All types	Forest type												
		Jack pine	Red pine	White pine	Black spruce	Balsam fir-white spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-cottonwood	Maple-beech-birch	Aspen	Paper birch	Nonstocked
SOFTWOODS:														
White pine	2,740,019	38,082	188,645	952,833	57,527	90,416	30,904	35,010	154,895	143,068	686,085	301,267	61,287	0
Red pine	1,533,777	44,960	890,957	110,688	19,735	15,822	1,115	5,359	67,051	3,689	49,540	288,846	36,015	0
Jack pine	1,109,810	693,752	31,382	20,375	3,897	896	0	0	174,942	5,804	3,375	164,216	11,172	0
White spruce	528,835	0	6,143	10,759	12,385	196,475	9,971	6,431	0	44,559	56,194	158,437	24,137	3,345
Black spruce	96,958	0	689	0	24,584	26,875	4,003	19,426	0	10,553	3,585	7,241	0	0
Balsam fir	1,027,422	0	8,165	11,125	2,810	412,511	6,152	16,957	0	92,603	203,829	234,938	36,816	1,518
Hemlock	1,878,634	0	743	3,073	0	46,835	26,540	2,263	2,739	68,110	1,706,691	10,201	11,437	0
Tamarack	174,167	0	1,786	2,068	3,399	7,170	18,764	73,634	5,234	24,671	1,433	31,133	3,726	1,148
N. white-cedar	1,226,987	0	1,895	13,808	5,042	193,340	506,935	8,907	0	201,220	253,349	25,788	16,703	0
Other softwoods	1,130	1,130	0	0	0	0	0	0	0	0	0	0	0	0
Total	10,317,740	777,925	1,130,406	1,124,728	129,378	990,341	604,385	167,987	404,861	594,277	2,964,081	1,222,069	201,293	6,011
HARDWOODS:														
White oak	1,439,872	0	0	3,315	0	0	1,029	0	1,083,491	65,847	213,380	53,128	17,632	2,050
Select red oak	3,216,434	6,152	1,763	11,162	0	2,169	0	0	2,055,143	44,326	810,971	194,884	88,810	1,054
Other red oak	1,272,287	28,884	7,598	6,588	0	0	0	0	1,091,404	5,658	55,213	65,093	5,802	6,048
Hickory	162,880	0	0	0	0	0	798	0	106,537	751	51,655	977	2,162	0
Yellow birch	679,738	0	0	0	801	23,579	7,572	0	1,932	40,670	594,325	6,437	4,423	0
Hard maple	2,946,387	0	1,084	2,859	1,101	17,094	0	1,630	62,011	35,681	2,779,404	27,714	15,464	2,346
Soft maple	1,442,997	0	0	9,237	1,685	45,229	12,960	1,078	73,959	525,949	695,311	54,923	22,665	0
Beech	81,010	0	0	0	0	0	0	0	0	965	80,045	0	0	0
Ash	992,048	0	0	3,405	0	14,028	5,749	0	29,838	501,447	398,135	31,981	4,882	2,583
Balsam poplar	90,774	0	0	0	0	2,596	2,351	0	2,757	30,556	20,243	25,587	6,684	0
Cottonwood	80,837	0	0	0	0	0	0	0	4,106	55,676	9,862	9,223	1,970	0
Paper birch	821,713	0	4,139	5,453	0	26,921	14,538	4,115	89,006	49,484	291,942	141,492	194,622	0
Bigtooth aspen	999,069	16,876	4,767	4,176	3,646	3,106	0	0	238,721	16,351	119,224	558,382	33,821	0
Quaking aspen	2,734,997	6,349	46,501	35,730	20,061	45,985	13,309	1,131	132,732	134,220	559,591	1,639,354	92,021	8,013
Basswood	1,555,976	0	0	0	0	3,509	4,378	0	63,411	74,278	1,377,176	27,654	5,570	0
Butternut	44,043	0	0	0	0	0	0	0	7,214	1,196	31,637	3,996	0	0
Black walnut	22,725	0	0	0	0	0	0	0	20,759	0	1,966	0	0	0
Black cherry	90,266	0	0	0	0	4,763	0	0	44,338	2,507	24,546	14,111	0	0
Elm	2,269,495	1,026	0	6,548	0	17,457	17,451	3,653	115,202	562,324	1,443,187	85,262	9,704	7,681
Other hardwoods	108,636	0	3,572	0	0	0	0	0	7,457	62,003	15,790	15,739	4,074	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	21,052,186	59,287	69,424	88,473	27,294	206,438	80,134	11,607	5,230,019	2,209,890	9,573,601	2,955,936	510,307	29,774
All species	31,369,926	837,212	1,199,829	1,213,201	156,672	1,196,778	684,519	179,594	5,634,880	2,804,167	12,537,683	4,178,005	711,600	35,786

1/Table may not add to total due to rounding.

2/International 1/4-inch rule.

Table 23.--Net volume of growing stock on commercial forest land by forest type and stand-age class, Wisconsin, 1979[1/]

(In thousand cubic feet)

Forest type	All classes	Stand-age class (years)										
		0-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Jack pine	511,898	14,548	67,549	139,472	220,780	51,764	11,486	6,299	0	0	0	0
Red pine	390,361	17,880	80,585	158,457	26,569	13,078	38,466	38,649	3,749	5,743	7,185	0
White pine	246,302	838	7,725	7,867	13,075	30,465	25,132	49,240	17,841	25,391	29,910	38,819
Black spruce	112,885	794	4,378	8,081	19,208	34,079	22,354	18,687	3,464	1,080	759	0
Balsam fir-white spruce	564,703	17,903	40,227	55,077	105,877	178,651	107,047	24,031	14,169	3,429	16,285	2,006
Northern white-cedar	355,374	3,365	8,543	5,176	16,535	44,489	70,337	45,765	25,295	59,371	35,906	40,592
Tamarack	128,907	5,044	11,465	6,101	7,920	28,066	36,975	16,020	10,980	2,918	3,419	0
Oak-hickory	2,143,599	49,902	49,460	79,635	306,506	409,018	319,165	238,505	172,252	179,603	270,020	69,535
Elm-ash-cottonwood	1,054,056	28,983	28,488	61,650	129,028	134,981	179,563	156,122	77,959	103,252	124,392	29,635
Maple-beech-birch	4,264,003	61,170	94,862	182,039	521,172	874,108	757,040	359,626	285,838	226,146	494,340	407,662
Aspen	2,449,040	277,043	326,698	319,148	824,351	528,465	130,488	29,467	5,199	3,874	825	3,481
Paper birch	494,796	13,549	24,417	49,769	135,025	144,490	93,503	20,732	1,758	9,813	1,740	0
Nonstocked	14,489	14,489	--	--	--	--	--	--	--	--	--	--
All types	12,730,413	505,508	744,397	1,072,473	2,326,048	2,471,652	1,791,556	1,003,144	618,505	620,618	984,782	591,730

1/Table may not add to total due to rounding.

Table 24.--Net volume of sawtimber on commercial forest land by forest type and stand-age class, Wisconsin, 1979[1/]

(In thousand board feet)[2/]

Forest type	All classes	Stand-age class (years)										
		0-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Jack pine	837,212	15,265	78,231	176,982	336,368	150,881	53,984	25,502	0	0	0	0
Red pine	1,199,829	34,664	43,065	516,207	92,167	60,080	183,900	194,868	13,487	29,473	31,918	0
White pine	1,213,201	0	28,834	27,891	44,318	116,658	116,623	248,944	97,584	141,084	173,017	218,247
Black spruce	156,672	0	3,745	2,872	6,668	58,356	28,060	51,440	4,010	0	1,520	0
Balsam fir-white spruce	1,196,778	38,498	92,914	112,066	218,391	378,663	204,267	43,283	41,497	17,996	47,291	1,912
Northern white-cedar	684,519	1,172	9,927	4,180	43,912	79,374	87,529	53,216	45,485	115,987	92,303	151,435
Tamarack	179,594	3,895	10,074	5,564	6,795	29,936	60,503	31,812	19,218	4,787	7,010	0
Oak-hickory	5,634,880	98,406	61,872	75,354	455,675	743,035	831,980	759,448	607,818	690,752	1,043,621	266,920
Elm-ash-cottonwood	2,804,167	64,380	52,003	98,819	251,538	306,363	470,671	440,945	265,100	322,419	413,356	118,571
Maple-beech-birch	12,537,683	159,041	137,398	332,431	939,585	1,909,844	1,897,145	1,136,310	1,070,982	880,415	2,107,945	1,966,587
Aspen	4,178,005	430,227	369,271	483,683	1,282,592	1,117,751	380,532	74,562	13,104	16,300	1,211	8,771
Paper birch	711,600	4,520	26,481	59,644	137,071	218,705	169,646	47,141	4,614	37,961	5,817	0
Nonstocked	35,786	35,786	--	--	--	--	--	--	--	--	--	--
All types	31,369,926	885,852	913,815	1,895,690	3,815,080	5,169,647	4,484,842	3,107,472	2,182,899	2,257,175	3,925,010	2,732,443

1/Table may not add to total due to rounding.

2/International 1/4-inch rule.

Table 25.--Net volume of all live trees on commercial forest land by tree class and species, Wisconsin, 1979[1/]

(In thousand cubic feet)

Species	All classes	Tree class				
		Desirable	Acceptable	Rough cull	Short-log cull	Rotten cull
SOFTWOODS:						
White pine	525,006	26,211	470,715	17,302	8,708	2,070
Red pine	453,147	16,641	433,319	2,405	529	253
Jack pine	616,064	5,353	580,517	26,029	2,295	1,869
White spruce	155,152	0	154,238	665	200	49
Black spruce	147,030	1,597	144,103	1,035	106	190
Balsam fir	552,472	1,335	548,138	2,453	117	429
Hemlock	366,835	19,041	339,132	3,891	2,249	2,522
Tamarack	148,925	1,535	143,810	1,735	1,190	657
N. white-cedar	500,544	4,255	476,043	9,366	3,719	7,161
Other softwoods	2,332	0	1,757	451	0	124
Total	3,467,508	75,968	3,291,773	65,332	19,113	15,322
HARDWOODS:						
White oak	544,778	12,087	441,012	58,156	28,781	4,742
Select red oak	1,115,306	66,721	981,236	39,331	20,451	7,567
Other red oak	600,068	9,163	435,144	115,039	30,704	10,018
Hickory	133,873	3,232	122,574	5,596	1,332	1,138
Yellow birch	233,347	8,577	202,177	8,589	3,874	10,131
Hard maple	1,264,949	38,245	1,105,429	70,896	27,237	23,141
Soft maple	903,752	20,472	783,416	67,433	16,087	16,344
Beech	24,985	498	18,032	2,484	2,764	1,207
Ash	567,116	20,886	517,047	21,252	5,093	2,838
Balsam poplar	24,586	1,781	20,095	1,080	556	1,074
Cottonwood	26,486	945	22,482	886	1,635	539
Paper birch	974,797	17,267	904,089	42,685	4,463	6,292
Bigtooth aspen	506,412	39,706	454,114	7,443	1,733	3,416
Quaking aspen	1,762,798	36,431	1,597,801	87,358	6,180	35,028
Basswood	701,185	51,087	599,112	30,999	12,180	7,807
Butternut	23,891	254	13,967	6,857	1,601	1,212
Black walnut	9,859	574	6,562	2,103	192	428
Black cherry	102,006	1,245	72,035	24,924	1,515	2,288
Elm	796,920	26,740	675,845	56,405	31,574	6,355
Other hardwoods	43,369	1,508	33,083	6,662	1,439	677
Noncommercial species	38,976	0	0	38,700	0	276
Total	10,399,459	357,419	9,005,253	694,877	199,392	142,518
All species	13,866,967	433,386	12,297,026	760,209	218,505	157,840

[1/]Table may not add to total due to rounding.

Table 26.--Periodic growth of growing stock on commercial forest land by component and forest type, Wisconsin, 1968-1979[1/]

(In thousand cubic feet)

Forest type	Component							
	Survivor growth	Growth on mortality	Growth on removals[2/]	Growth on ingrowth	Ingrowth	Mortality	Net growth	Removals[2/]
Jack pine	147,592	9,286	28,465	34,044	84,097	-26,390	277,093	132,295
Red pine	86,125	3,283	11,352	31,892	50,782	-11,415	172,018	45,127
White pine	67,553	1,742	4,522	1,524	5,715	-11,678	69,378	33,559
Black spruce	22,473	2,591	1,921	3,706	22,993	-9,576	44,109	11,004
Balsam fir-white spruce	158,741	11,006	10,825	12,845	50,975	-56,124	188,267	80,074
Northern white-cedar	65,057	4,378	1,003	3,477	27,842	-29,880	71,879	15,304
Tamarack	31,525	2,809	827	3,794	14,366	-15,117	38,204	3,274
Oak-hickory	466,324	29,117	36,286	17,832	63,198	-206,000	406,757	330,993
Elm-ash-cottonwood	248,791	17,424	18,904	10,653	42,626	-109,481	228,917	155,328
Maple-beech-birch	895,184	55,916	44,568	32,157	179,888	-362,137	845,576	389,240
Aspen	810,435	116,324	186,479	95,657	208,509	-402,121	1,015,284	779,949
Paper birch	133,823	6,777	15,791	11,942	35,607	-29,943	173,999	78,583
Nonstocked	4,220	132	289	1,352	2,337	-564	7,766	1,176
All types	3,137,843	260,785	361,232	260,877	788,936	-1,270,427	3,539,247	2,055,908

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

[2/]Data presented are growing-stock removals for products.

Table 27.--Periodic growth of growing stock on commercial forest land by component and species, Wisconsin, 1968-1979[1/]

(In thousand cubic feet)

Species	Component							
	Survivor growth	Growth on mortality	Growth on removals[2/]	Growth on ingrowth	Ingrowth	Mortality	Net growth	Removals[2/]
SOFTWOODS:								
White pine	148,400	1,971	13,381	1,917	8,697	-12,585	161,781	84,460
Red pine	109,352	1,324	17,173	42,640	62,854	-1,866	231,477	74,418
Jack pine	173,483	9,896	31,210	33,911	89,725	-28,506	309,720	138,000
White spruce	54,979	1,639	3,463	8,679	11,919	-5,401	75,277	9,130
Black spruce	26,145	1,368	1,622	5,397	31,001	-6,792	58,742	13,789
Balsam fir	177,223	13,918	14,725	17,831	59,455	-77,836	205,315	73,593
Hemlock	65,328	1,588	4,773	176	1,055	-15,126	57,793	51,561
Tamarack	30,157	4,055	325	2,787	12,588	-20,553	29,360	2,713
N. white-cedar	108,831	3,004	372	4,989	31,255	-13,979	134,472	3,398
Other softwoods	365	0	0	207	745	0	1,316	0
Total	894,263	38,763	87,044	118,534	309,293	-182,643	1,265,253	451,061
HARDWOODS:								
White oak	92,478	2,495	3,946	948	5,188	-18,257	86,799	42,282
Select red oak	232,064	7,861	21,561	3,891	19,099	-61,306	223,169	204,812
Other red oak	90,784	3,371	1,108	2,540	12,084	-31,384	78,502	7,194
Hickory	17,764	687	194	308	2,557	-5,840	15,670	3,056
Yellow birch	36,184	2,791	2,159	657	2,680	-25,894	18,577	25,613
Hard maple	223,997	8,319	13,538	12,189	69,962	-51,207	276,797	120,454
Soft maple	155,233	8,654	9,254	11,270	67,102	-56,459	195,054	74,324
Beech	3,443	514	194	79	656	-7,922	-3,037	2,471
Ash	94,235	6,760	4,128	3,162	25,517	-69,111	64,692	39,564
Balsam poplar	6,114	1,959	2,422	162	259	-8,557	2,360	13,064
Cottonwood	5,169	212	231	62	714	-1,523	4,865	2,146
Paper birch	230,548	4,205	10,303	16,807	53,589	-29,226	286,226	77,563
Bigtooth aspen	151,505	20,190	24,482	8,048	14,967	-127,726	91,466	126,702
Quaking aspen	568,932	127,491	151,424	67,823	141,181	-416,645	640,206	619,234
Basswood	144,421	6,033	5,308	3,629	20,900	-42,377	137,913	51,165
Butternut	3,367	807	161	0	0	-7,009	-2,674	1,874
Black walnut	1,751	403	6	0	0	-2,485	-325	159
Black cherry	15,228	4,212	1,079	2,765	8,765	-26,239	5,810	7,817
Elm	162,194	14,399	22,453	7,732	32,789	-90,022	149,544	183,302
Other hardwoods	8,170	661	237	273	1,633	-8,595	2,379	2,054
Noncommercial species	0	0	0	0	0	0	0	0
Total	2,243,580	222,023	274,188	142,343	479,644	-1,087,783	2,273,994	1,604,847
All species	3,137,843	260,785	361,232	260,877	788,936	-1,270,427	3,539,247	2,055,908

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

[2/]Data presented are growing-stock removals for products.

Table 28.--Average annual growth of growing stock on commercial forest land by component and forest type, Wisconsin, 1968-1979[1/]

(In thousand cubic feet)

Forest type	Component							
	Survivor growth	Growth on mortality	Growth on removals[2/]	Growth on ingrowth	Ingrowth	Mortality	Net growth	Removals[2/]
Jack pine	15,397	845	2,619	3,107	7,683	-2,413	27,237	12,684
Red pine	12,199	342	1,136	2,951	4,855	-1,416	20,068	5,125
White pine	6,141	158	411	139	520	-1,062	6,307	3,051
Black spruce	2,355	249	182	351	2,322	-1,088	4,371	1,151
Balsam fir-white spruce	16,492	1,058	1,124	1,195	4,998	-6,509	18,358	10,099
Northern white-cedar	7,364	420	127	333	3,141	-3,285	8,099	2,902
Tamarack	2,993	262	77	345	1,306	-1,487	3,496	324
Oak-hickory	43,292	2,672	3,309	1,621	5,745	-18,997	37,643	30,884
Elm-ash-cottonwood	23,189	1,593	1,729	968	3,875	-10,308	21,047	14,397
Maple-beech-birch	90,819	5,295	4,164	3,008	18,990	-36,837	85,439	36,182
Aspen	78,708	10,669	17,181	8,797	19,944	-38,198	97,101	74,502
Paper birch	12,994	618	1,439	1,096	3,312	-2,775	16,684	7,235
Nonstocked	384	12	26	123	212	-51	706	107
All types	312,326	24,192	33,525	24,035	76,903	-124,425	346,557	198,642

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

[2/]Data presented are growing-stock removals for products.

Table 29.--Average annual growth of growing stock on commercial forest land by component and species, Wisconsin, 1968-1979[1/]

(In thousand cubic feet)

Species	Component							
	Survivor growth	Growth on mortality	Growth on removals[2/]	Growth on ingrowth	Ingrowth	Mortality	Net growth	Removals[2/]
SOFTWOODS:								
White pine	14,443	190	1,235	174	791	-1,234	15,598	7,948
Red pine	13,931	120	1,645	3,965	6,156	-170	25,648	7,323
Jack pine	17,732	900	2,862	3,083	8,157	-2,592	30,141	13,144
White spruce	6,154	166	335	798	1,279	-618	8,114	979
Black spruce	2,741	125	174	501	3,228	-680	6,088	2,307
Balsam fir	17,209	1,315	1,387	1,645	5,569	-8,576	18,550	8,100
Hemlock	6,734	158	442	16	96	-1,536	5,909	4,853
Tamarack	3,069	377	30	253	1,144	-2,043	2,830	250
N. white-cedar	11,250	286	41	465	3,133	-1,472	13,704	405
Other softwoods	33	0	0	19	68	0	120	0
Total	93,295	3,638	8,150	10,920	29,621	-18,923	126,701	45,309
HARDWOODS:								
White oak	8,407	227	359	86	472	-1,660	7,891	3,844
Select red oak	22,449	720	1,962	357	1,919	-5,692	21,714	18,660
Other red oak	8,253	306	101	231	1,099	-2,853	7,137	654
Hickory	1,615	62	18	28	232	-531	1,425	278
Yellow birch	3,928	275	200	60	244	-2,802	1,904	2,419
Hard maple	23,697	806	1,247	1,146	7,503	-5,444	28,955	11,432
Soft maple	15,261	799	848	1,035	6,884	-5,532	19,294	6,977
Beech	319	47	18	7	60	-720	-270	225
Ash	9,017	640	376	296	2,729	-7,149	5,910	3,677
Balsam poplar	564	178	223	15	24	-778	225	1,261
Cottonwood	470	19	21	6	65	-138	442	195
Paper birch	22,511	388	949	1,528	4,872	-2,876	27,371	7,523
Bigtooth aspen	14,642	1,894	2,258	752	1,450	-12,483	8,513	12,106
Quaking aspen	54,716	11,741	14,033	6,241	13,466	-39,922	60,275	60,874
Basswood	14,571	571	491	331	2,114	-4,274	13,805	4,857
Butternut	315	73	15	0	0	-637	-234	174
Black walnut	159	37	1	0	0	-226	-30	14
Black cherry	1,498	389	98	251	797	-2,531	503	711
Elm	15,897	1,322	2,138	720	3,206	-8,473	14,810	17,266
Other hardwoods	743	60	22	25	148	-781	216	187
Noncommercial species	0	0	0	0	0	0	0	0
Total	219,032	20,554	25,375	13,115	47,282	-105,503	219,856	153,333
All species	312,326	24,192	33,525	24,035	76,903	-124,425	346,557	198,642

[1/] Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

[2/] Data presented are growing-stock removals for products.

Table 30.--Periodic growth of sawtimber on commercial forest land by component and forest type, Wisconsin, 1968-1979[1/]

(In thousand board feet)[2/]

Forest type	Component							
	Survivor growth	Growth on mortality	Growth on removals[3/]	Growth on ingrowth	Ingrowth	Mortality	Net growth	Removals[3/]
Jack pine	94,876	19,562	98,405	226,952	307,391	-34,692	712,494	271,599
Red pine	192,679	4,016	35,295	99,547	200,703	-15,476	516,764	137,241
White pine	321,019	6,546	28,411	45,563	57,989	-31,845	427,683	162,916
Black spruce	30,340	448	5,355	13,767	18,646	-6,151	62,405	24,093
Balsam fir-white spruce	219,266	27,633	40,481	191,136	264,314	-96,272	646,558	190,845
Northern white-cedar	106,151	5,230	3,287	63,087	85,370	-30,278	232,848	30,248
Tamarack	32,161	8,229	1,248	32,038	41,844	-15,664	99,855	3,638
Oak-hickory	782,534	78,334	133,709	514,233	654,479	-435,946	1,727,343	1,120,626
Elm-ash-cottonwood	505,305	45,024	80,952	263,702	338,280	-224,219	1,009,044	443,084
Maple-beech-birch	2,144,363	164,095	158,208	803,698	1,093,773	-866,736	3,497,400	1,073,898
Aspen	671,995	194,102	390,956	921,557	1,220,438	-413,928	2,985,121	935,889
Paper birch	117,909	9,580	39,769	124,655	161,513	-31,730	421,696	134,630
Nonstocked	7,524	593	2,468	5,564	7,081	-2,422	20,808	3,436
All types	5,226,122	563,391	1,018,544	3,305,498	4,451,821	-2,205,359	12,360,018	4,532,144

1/Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

2/International 1/4-inch rule.

3/Data presented are growing-stock removals for products.

Table 31.--Periodic growth of sawtimber on commercial forest land by component and species, Wisconsin, 1968-1979[1/]

(In thousand board feet)[2/]

Species	Component							
	Survivor growth	Growth on mortality	Growth on removals[3/]	Growth on ingrowth	Ingrowth	Mortality	Net growth	Removals[3/]
SOFTWOODS:								
White pine	827,831	12,813	90,436	64,716	83,104	-64,679	1,014,222	466,579
Red pine	271,044	1,795	67,462	132,338	249,406	-3,577	718,469	321,710
Jack pine	132,984	25,877	102,688	283,956	379,941	-44,911	880,534	263,669
White spruce	118,843	5,779	8,362	81,691	119,449	-15,095	319,029	23,039
Black spruce	10,475	193	2,032	15,293	21,464	-5,091	44,366	7,307
Balsam fir	163,907	25,140	35,808	239,624	315,814	-112,105	668,187	104,334
Hemlock	327,548	8,031	27,843	36,479	50,231	-75,153	374,979	239,091
Tamarack	30,541	3,268	525	25,146	32,064	-14,652	76,892	3,579
N. white-cedar	236,795	4,578	1,754	109,103	145,911	-22,974	475,167	9,855
Other softwoods	0	0	0	497	633	0	1,130	0
Total	2,119,968	87,472	336,911	988,843	1,398,017	-358,237	4,572,974	1,439,164
HARDWOODS:								
White oak	179,509	6,920	15,402	110,398	140,507	-39,412	413,323	142,255
Select red oak	476,982	27,555	81,576	277,903	362,976	-182,643	1,044,350	770,236
Other red oak	157,577	12,352	5,541	10[illegible]07	137,208	-77,554	342,930	15,333
Hickory	12,176	102	212	2[illegible]80	29,883	-4,196	61,658	4,322
Yellow birch	100,198	8,080	7,535	24,785	34,171	-67,080	107,690	80,025
Hard maple	510,110	28,474	36,930	151,219	203,552	-132,542	797,744	310,693
Soft maple	193,891	11,800	12,139	131,974	177,075	-67,627	459,253	78,814
Beech	11,781	1,507	561	4,604	6,837	-31,234	-5,944	8,741
Ash	117,261	7,388	4,548	98,166	124,939	-75,391	276,912	46,035
Balsam poplar	19,501	8,352	7,994	7,546	9,605	-26,091	26,908	29,258
Cottonwood	13,124	651	320	5,245	6,675	-6,002	20,013	4,396
Paper birch	96,300	4,686	8,416	164,692	215,402	-10,398	479,098	30,462
Bigtooth aspen	137,882	51,499	51,661	182,827	240,894	-229,460	435,303	143,440
Quaking aspen	379,277	219,308	326,299	690,200	905,416	-457,360	2,063,139	702,057
Basswood	238,035	18,785	10,811	143,360	199,607	-83,931	526,667	87,081
Butternut	5,075	2,389	181	5,667	7,213	-24,041	-3,517	3,065
Black walnut	3,201	2,778	0	1,685	2,145	-9,712	97	0
Black cherry	10,162	4,009	594	15,485	19,709	-34,614	15,345	6,171
Elm	429,275	54,706	109,904	159,790	217,491	-256,625	714,540	621,823
Other hardwoods	14,836	4,578	1,007	9,822	12,501	-31,210	11,533	8,774
Noncommercial species	0	0	0	0	0	0	0	0
Total	3,106,154	475,919	681,633	2,316,656	3,053,805	-1,847,122	7,787,044	3,092,980
All species	5,226,122	563,391	1,018,544	3,305,498	4,451,821	-2,205,359	12,360,018	4,532,144

1/Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

2/International 1/4-inch rule.

3/Data presented are growing-stock removals for products.

Table 32.--Average annual growth of sawtimber on commercial forest land by component and forest type, Wisconsin, 1968-1979[1/]

(In thousand board feet)[2/]

Forest type	Component							
	Survivor growth	Growth on mortality	Growth on removals[3/]	Growth on ingrowth	Ingrowth	Mortality	Net growth	Removals[3/]
Jack pine	9,495	1,781	9,043	21,374	33,291	-3,217	71,766	27,231
Red pine	27,738	449	3,621	12,010	36,157	-2,078	77,896	16,081
White pine	29,184	595	2,583	4,142	5,272	-2,895	38,880	14,811
Black spruce	3,601	99	488	1,297	1,931	-1,175	6,241	2,223
Balsam fir-white spruce	23,958	2,900	4,753	18,218	29,401	-11,537	67,692	23,764
Northern white-cedar	12,561	556	324	5,938	9,134	-3,851	24,663	3,387
Tamarack	3,087	770	123	2,955	4,028	-1,753	9,211	483
Oak-hickory	71,320	7,121	12,155	46,748	59,498	-39,631	157,212	101,875
Elm-ash-cottonwood	46,601	4,106	7,406	24,079	31,444	-21,317	92,319	41,751
Maple-beech-birch	215,553	15,384	14,400	75,899	116,859	-85,665	352,430	97,850
Aspen	65,745	17,721	35,973	85,680	123,331	-39,318	289,133	87,895
Paper birch	11,300	871	3,624	11,447	15,284	-2,885	39,640	12,475
Nonstocked	684	54	224	506	644	-220	1,892	312
All types	520,826	52,408	94,717	310,293	466,275	-215,543	1,228,975	430,138

[1/]Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

[2/]International 1/4-inch rule.

[3/]Data presented are growing-stock removals for products.

Table 33.--Average annual growth of sawtimber on commercial forest land by component and species, Wisconsin, 1968-1979[1/]

(In thousand board feet)[2/]

Species	Component							
	Survivor growth	Growth on mortality	Growth on removals[3/]	Growth on ingrowth	Ingrowth	Mortality	Net growth	Removals[3/]
SOFTWOODS:								
White pine	80,147	1,224	8,324	5,913	7,710	-6,347	96,971	43,888
Red pine	33,142	163	6,494	15,270	42,391	-325	97,135	32,156
Jack pine	12,916	2,352	9,402	26,556	39,886	-4,083	87,030	26,116
White spruce	13,088	587	817	8,046	14,109	-1,568	35,080	2,528
Black spruce	1,124	18	207	1,470	2,449	-463	4,805	1,125
Balsam fir	16,231	2,605	3,822	22,218	31,520	-13,773	62,624	11,474
Hemlock	33,895	803	2,577	3,468	5,365	-7,715	38,393	22,684
Tamarack	2,910	304	48	2,288	2,927	-1,552	6,926	325
N. white-cedar	25,698	508	211	10,201	15,195	-3,276	48,537	1,247
Other softwoods	0	0	0	45	58	0	103	0
Total	219,151	8,564	31,904	95,474	161,611	-39,100	477,604	141,543
HARDWOODS:								
White oak	16,319	629	1,400	10,036	12,773	-3,583	37,575	12,932
Select red oak	44,328	2,527	7,416	25,635	35,637	-17,263	98,279	70,021
Other red oak	14,325	1,123	504	9,801	12,473	-7,050	31,175	1,394
Hickory	1,107	9	19	2,135	2,717	-381	5,605	393
Yellow birch	10,500	956	704	2,358	3,746	-6,589	11,675	7,659
Hard maple	52,257	2,615	3,357	14,191	21,239	-12,564	81,095	28,245
Soft maple	18,907	1,084	1,104	12,362	18,539	-6,428	45,568	7,169
Beech	1,071	137	51	458	827	-2,839	-296	795
Ash	11,316	682	413	8,924	11,358	-7,565	25,128	4,185
Balsam poplar	1,785	759	1,052	686	873	-2,372	2,784	2,985
Cottonwood	1,193	59	29	477	607	-546	1,819	400
Paper birch	9,436	426	786	15,204	21,164	-945	46,070	3,328
Bigtooth aspen	13,322	4,689	4,739	16,949	24,241	-21,206	42,734	13,636
Quaking aspen	37,002	20,143	30,042	63,825	89,001	-45,058	194,955	67,682
Basswood	24,054	1,750	997	13,719	22,354	-8,616	54,257	8,124
Butternut	497	217	17	515	656	-2,186	-284	287
Black walnut	291	253	0	153	195	-883	9	0
Black cherry	1,012	371	54	1,408	1,792	-3,429	1,207	561
Elm	41,606	4,999	10,038	15,091	23,337	-24,103	70,968	58,000
Other hardwoods	1,349	416	92	893	1,136	-2,837	1,048	798
Noncommercial species	0	0	0	0	0	0	0	0
Total	301,675	43,843	62,813	214,818	304,663	-176,442	751,371	288,594
All species	520,826	52,408	94,717	310,293	466,275	-215,543	1,228,975	430,138

1/Table may not add to total due to rounding. Table includes data for the Nicolet and Chequamegon National Forests, from 1975 and 1976 respectively.

2/International 1/4-inch rule.

3/Data presented are growing-stock removals for products.

Table 34.--All live tree biomass on commercial forest land by species and component, Wisconsin, 1979[1/]

(In thousand green tons)

Species	All components	Component				
		Growing-stock boles	Growing-stock tops and limbs	Cull boles	Cull tops and limbs	1- to 5-inch trees
SOFTWOODS:						
White pine	19,173	11,140	5,214	741	556	1,523
Red pine	22,354	11,991	6,582	122	141	3,517
Jack pine	37,851	17,383	8,280	1,202	1,368	9,619
White spruce	5,934	3,100	1,545	25	37	1,226
Black spruce	11,674	2,734	1,339	33	38	7,530
Balsam fir	33,155	14,108	6,817	105	147	11,978
Hemlock	15,112	9,157	4,356	296	319	983
Tamarack	8,098	3,769	2,075	107	145	2,002
N. white-cedar	18,943	8,079	4,276	434	484	5,670
Other softwoods	149	46	21	18	15	49
Total	172,442	81,508	40,504	3,083	3,250	44,097
HARDWOODS:						
White oak	32,954	16,246	7,245	3,667	2,807	2,990
Select red oak	60,561	37,025	16,951	2,611	2,027	1,946
Other red oak	37,682	16,013	7,372	6,126	4,435	3,736
Hickory	8,533	4,572	1,952	330	255	1,423
Yellow birch	14,127	6,845	3,377	880	953	2,072
Hard maple	83,817	36,346	16,864	4,224	3,325	23,058
Soft maple	54,849	22,064	10,071	2,999	2,311	17,404
Beech	1,217	539	239	208	149	81
Ash	29,731	15,545	7,400	943	784	5,059
Balsam poplar	990	529	270	73	56	62
Cottonwood	1,132	657	309	86	41	39
Paper birch	52,830	26,025	12,642	1,613	1,185	11,364
Bigtooth aspen	20,779	12,920	5,888	376	275	1,320
Quaking aspen	80,908	42,095	20,467	3,705	2,814	11,828
Basswood	29,237	17,071	7,489	1,453	912	2,311
Butternut	1,159	435	191	308	167	58
Black walnut	440	217	95	85	42	0
Black cherry	6,100	2,252	977	907	449	1,515
Elm	40,955	21,627	9,725	3,123	2,201	4,280
Other hardwoods	2,158	1,016	452	297	235	158
Noncommercial species	8,994	0	0	1,218	672	7,105
Total	569,155	280,040	129,977	35,233	26,093	97,812
All species	741,597	361,548	170,481	38,316	29,343	141,909

[1/]Table may not add to total due to rounding.

Table 35.--All live tree biomass on commercial forest land by forest type and stand-age class, Wisconsin, 1979[1/]

(In thousand green tons)

Forest type	All classes	Stand-age class (years)										
		0-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Jack pine	34,437	1,837	6,345	9,711	13,055	2,618	597	274	0	0	0	0
Red pine	20,716	1,969	5,236	7,665	1,218	625	1,541	1,606	387	199	270	0
White pine	10,705	149	530	418	720	1,514	1,111	1,875	814	1,101	1,075	1,398
Black spruce	10,228	91	319	763	1,991	2,948	2,278	982	381	80	395	0
Balsam fir-white spruce	30,991	1,105	2,430	3,923	6,463	9,223	5,127	1,083	641	123	793	79
Northern white-cedar	18,131	367	634	501	1,017	2,698	3,917	2,306	1,084	3,109	1,355	1,143
Tamarack	7,703	455	1,055	593	508	1,599	1,943	804	523	110	113	0
Oak-hickory	131,644	4,721	4,952	5,836	18,174	22,821	22,417	15,889	9,602	10,473	13,365	3,394
Elm-ash-cottonwood	55,127	2,682	2,630	4,620	7,613	7,183	8,774	7,236	3,585	4,357	5,344	1,102
Maple-beech-birch	249,856	5,483	8,923	13,468	36,882	51,415	41,544	19,918	15,474	12,511	25,115	19,123
Aspen	140,103	21,382	24,471	17,405	41,620	26,452	6,754	1,446	228	164	33	148
Paper birch	28,136	1,337	2,399	3,064	7,618	7,369	4,753	993	56	463	83	0
Non-stocked	3,821	3,821	--	--	--	--	--	--	--	--	--	--
All types	741,597	45,400	59,925	67,969	136,879	136,464	100,755	54,412	32,774	32,690	47,940	26,388

[1/]Table may not add to total due to rounding.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1982-565-846/194

Raile, Gerhard K., and W. Brad Smith.
1982. A simulated inventory update: Wisconsin's 1979 timber resource. U.S. Department of Agriculture Forest Service, Research Paper NC-209, 40 p. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.

Presents Wisconsin timber resource statistics that were updated by the tree growth projection subsystem of the Forest Resources Evaluation Program (FREP).

KEY WORDS: Lake States, volume, growth, mortality, removals, FREP.